

**INFLUENCES ON AAPI ADOLESCENTS' SEXUAL INITIATION: MOTHER-
ADOLESCENT INTERACTIONS, RACIAL/ETHNICITY, GENDER, AND
ACCULTURATION**

by

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DEDICATION

To my mother, Tsao, my husband, Shyi-Ping, my son, Jeffrey, and my daughter, Stephanie, who were all behind me every step of the way.

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ABSTRACT

The purpose of this secondary analysis was to explore maternal influences on Asian American Pacific Islanders (AAPI) adolescents' sexual initiation over two time points. Additional objectives were to understand the potential differences arising from racial/cultural, gender, and acculturation factors. Maternal influences were evaluated by the interactions between mother and adolescent (i.e., maternal sexual discussion, adolescents' perceived general communication, and connectedness) and adolescents' perceived maternal sexual expectations (APMSE). Structural equation modeling was used to simultaneously test the relationships among the specified exogenous and endogenous variables. EQS 6.1 for Windows was used for model testing.

The focal population of this secondary analysis was AAPI adolescents and their mothers. Additionally, cross-cultural differences were assessed at two time points of 433 AAPI, 1,241 Hispanic Americans, 1,367 African Americans, and 4,597 white adolescents from the Add Health data. Further, gender differences between AAPI adolescent males and females were examined in a comparison model. The influences of acculturation on AAPI adolescents' sexual initiation also were examined using two covariates, adolescents' language spoken at home and their length of United States residency.

The fit indices showed that the hypothesized models fit the data fairly well. Overall, the degree of associations among adolescents' sexual initiation, mother-adolescent interactions, and APMSE varied among the racial/cultural groups. APMSE

emerged as an important predictor for AAPI adolescents' sexual initiation over time. However, the relationship between maternal sexual discussion and APMSE differed between AAPI adolescent males and females. Moreover, adolescents' level of acculturation also played an important role on how AAPI adolescents perceive their mothers' sexual expectations (APMSE).

The findings suggest that a cultural perspective is needed when promoting adolescents' sexual health. Nursing interventions to delay early sexual initiation should focus on promotion of maternal influences and consideration of adolescents' gender, level of acculturation, and racial/cultural backgrounds. Future studies should investigate the potential differences influenced by gender and the level of acculturation among other racial/ethnic groups. Furthermore, an exploration of paternal influences on adolescents' sexual initiation should be considered in the future endeavor.

CHAPTER I

Introduction

The general format of this dissertation uses a three article/paper option. Chapter I is designated for the overview; Chapters II, III, IV are the three articles; and Chapter V focuses on the discussion and conclusions of this dissertation.

Statement of Purpose

The main purpose of this secondary data analysis was to evaluate a longitudinal model of Asian American/Pacific Islanders (AAPI) mother-adolescent interactions—specifically, the mothers’ perceptions of sexual discussion, connectedness, and adolescents’ perceptions of general communication and connectedness with their mothers—and their effects on AAPI adolescents’ perceived maternal sexual expectations (APMSE) and their first sexual initiation over two time periods. Additional objectives of the study were to test whether or not the variations in cultural background at home, adolescent’s gender, and acculturation factors (i.e., years of residence in the United States and language spoken at home) influence how adolescents perceive maternal sexual expectations and the relationship between perceived maternal expectations and the age of sexual initiation over two time periods.

The overall specific aims of this research were 1) to explore the relationship between maternal influences and adolescents’ sexual initiation across specific racial and ethnic groups (APPI, African American, white, and Hispanic); 2) to explore

acculturation influences, (years of residence in the United States, and the language spoken at home) on the relationship between maternal influences and adolescents' sexual initiation among AAPI adolescents; and 3) to explore gender variations in the relationship between maternal influences and sexual initiation among AAPI adolescents.

These explorations are relevant because adolescents from different cultures may have different mechanisms for how they perceive their mothers' expectations or how these expectations may influence adolescents' sexual initiation. By examining models of these relationships, several questions can be explored. For example, can APMSE serve as a protective factor for delaying AAPI adolescents' sexual initiation? Does the protection differ from that of other ethnic adolescents? Do acculturation and gender factors influence how AAPI adolescents perceive their mothers' sexual expectations? These comparisons are key to evaluating the appropriateness of utilizing knowledge gained from other cultural studies and to further assess maternal influences on adolescents' sexual behaviors, taking into consideration the variation of adolescents' cultural backgrounds at home.

Structure of the Dissertation

The specific aims of this dissertation research are examined in detail in the next three chapters with the focus on exploring factors that may be associated with AAPI adolescents' sexual behavior. Each chapter will serve as the basis for a manuscript. The specific focus of Chapter II is to explore the relationships among AAPI mothers' and adolescents' perceptions of their interactions (specifically mothers' perceptions of sexual discussions and connectedness; adolescents'

perceptions of general communications and connectedness), adolescents' perceived maternal sexual expectation (APMSE), and adolescents' sexual initiation. The focus for Chapter III is to compare relationships among mothers' and adolescents' perceptions of their interactions, APMSE and adolescents' age at first sexual initiation across ethnic groups, namely AAPI, African American, white, and Hispanic adolescents. The focus for Chapter IV is to examine to determine whether the relationships among AAPI mothers' and adolescents' perceptions of their interactions, APMSE, and adolescents sexual initiation vary according to adolescents' gender and the level of acculturation (as measured by their years of U.S. residence and language spoken at home).

Background and Significance

Significance of the Problem

In 2005, there were approximately 14.5 million Asian American/Pacific Islanders (AAPIs) in the United States, comprising about 5.5% of the total U.S. population. In fact, this population group has increased rapidly in the past decade. Between 2000 and 2005, the estimated increase for Asians living in the United States was 21%, and the increase of native Hawaiians and Pacific Islanders was 13.3%. Despite this substantial increase, the sexual health problems of AAPI adolescents often is overlooked because of their stereotyped label as being a trouble-free, "model minority." Yet, among AAPIs HIV/AIDS has been on the rise. For example, the number of AAPIs living with AIDS has increased rapidly and represents about one percent of AIDS cases in the United States. Based on the most current national data, in

2004, an estimated 7,317 AAPIs were living with AIDS, compared to 1,010 in 1992 (CDC, 2004), a seven-fold increase in 12 years. Between 1999 and 2003, AAPIs diagnosed with AIDS increased by 34%. Yet, AAPIs still are less likely than people of other groups to get tested for HIV (APIAHF, 2007).

Furthermore, in regard to receiving sexual health care, the sexual health of AAPI women often is compromised. AAPI women have incurred the highest increases in rates of certain sexually transmitted infections (STIs), such as gonorrhea and HIV/AIDS (Foo, 2002), and although heterosexual contact is identified as the primary source of new cases of HIV/AIDS for AAPI women, there is a dearth of literature regarding baseline sexual risk behavior for this population.

Currently, the main strategies used to prevent unintended pregnancies for adolescents are school-based sex education and the provision of birth control through family planning and health clinics. Although both approaches have been shown to be effective in terms of increasing the use of birth control and decreasing unintended pregnancies, some researchers (Hayman, 2002; Hovell et al., 1994; Jaccard, Dodge, Dittus, Feldman, & Rosenthal, 2002; Kirby, Miller, Feldman, & Rosenthal, 2002; Kirkman, Rosenthal, & Feldman, 2002) suggest that improving parent-adolescent interactions about sex could further reduce adolescents' risky sexual behaviors, such as delaying age of sexual initiation, decreasing the frequency of intercourse, decreasing unplanned pregnancies, and increasing condom use, which, in turn, could potentially decrease the amount of STIs in adolescents.

Although mother-adolescent sexual communication has been identified as an important domain for the sexual health of other groups of adolescents, it is not clear

whether it has similar effects in AAPI adolescents. If promoting AAPI mothers and adolescents' interactions could have a positive influence on delaying adolescents' sexual initiation, the question remains which components of mother-adolescent interactions are significant for influencing adolescents' sexual behaviors including sexual initiation, and whether adolescents' gender and the level of acculturation moderate how AAPI adolescents perceive their mothers' sexual expectations. This dissertation research project aims to delineate the mother-adolescent interactions and their relationships to adolescents' sexual initiation using the ecological model as the theoretical framework. The focal population of this research project is AAPI adolescents. To understand cultural influences, three comparison models are examined to provide a basic understanding about the effects of APMSE when variations of cultural background at home are introduced. To understand gender influences, a gender comparison model is explored for AAPI adolescents. Finally, acculturation influences on AAPI adolescents' sexual initiation are examined with a covariate model.

Theoretical Framework

Bronfenbrenner's Social Ecological Model (Wilson, 2003) is used as the underlying theoretical framework to understand the environmental influences that come from the macro-, meso-, and micro-system levels. The rationale for choosing the social ecological model is that this framework considers the environments in which AAPI adolescents interact and advocates consideration of reciprocal, ever changing, multi-contextual interactions without reductionism. This framework considers adolescents' developmental influences and emphasizes social interactions at multiple levels (Hovell, Hillman, Blumberg, & Sipan, 1994; Pantin, Schwartz, Sullivan, Prado, & Szapocznik,

2004). For AAPI adolescents, the consideration of the overall social and bicultural influences is required, especially with the “trickle down” effects that might come from the macro-system and the interactions (meso-systems) among family members, peers, school, neighbors, and community. Furthermore, it also could help understand intra- and inter-personal relationships such as the formation of adolescents’ perceived maternal sexual expectations (APMSE) and its relationships with other variables (i.e., mothers’ perceptions of sexual discussion, and connectedness; adolescents’ perceptions of general communication and connectedness) in mother-adolescents interactions. Because of the complexity of social ecological model, at this time it is not feasible to examine AAPI adolescents’ sexual health behaviors and consider all of the influences that may come from all levels of the ecosystem. However, it is appropriate to use this theoretical framework to focus on selected elements from the macro-, meso- and micro-ecosystems. For instance, this framework may be used to understand the influences that come from the macro-system level (e.g., acculturation influences), meso-system level (e.g., the interactions between mother and adolescents), and micro-system level (e.g., APMSE, gender, and age of sexual initiation). This framework can guide our understanding of how AAPI adolescents perceive their mothers’ sexual expectations by examining mothers’ and adolescents’ perceptions of interactions and identifying potential relationships with their sexual behaviors over two time periods (Cash & Wilke, 2003).

Another framework used to explicate the possible factors related to mother-adolescent interactions is the expectancy violation-realignment model (Collins & Luebker, 1994). This model suggests that through interactions, both parent and

adolescent constantly realign their expectations (and behaviors) with each other. Because the expectancy is a result of the constant realignments between mother and adolescent, it is possible to use adolescents' perceived maternal sexual expectations (APMSE) to reflect the level of maternal influences with the assumptions that a positive interaction between mother and adolescent would promote a higher level of perceived maternal sexual expectations for adolescents. Hence, the notion of expectancy violation-realignment between mother and adolescent can be used to posit the possible influences of adolescents' perceived maternal sexual expectations (APMSE).

Preliminary Work

In a preliminary qualitative study (Kao, 2007), four focus group interviews (n = 20) were conducted with two separate sets of Taiwanese American adolescent girl-mother dyads to explore their perceptions of sexual health. The preliminary study resulted in the development of the concept of "bicultural straddling," which was later defined as a balancing act of adaptation as a result of living within two different cultural influences (expectations). Moreover, a conceptual framework (Figure 1) was developed that was used in the current study.

From the preliminary study (Kao, 2007), results indicated that only two out of 10 mother-daughter dyads talked to each other about reproductive health (framed as equal to sexual health, e.g., how to take care of their menstrual cycles). However, even in these two mother-daughter dyads, the frequency and the depth of sexual discussions were very limited. These mothers expressed their desire to talk with their daughters about sex-related issues, but found it difficult to do so mainly because of their inexperience (or embarrassment) with these kinds of talks and problems with

conducting such discussions in English. Although the majority of the mothers (8 of 10) had at least a college degree, they found it extremely difficult to discuss issues such as STIs and contraception with their U.S.-born and raised daughters.

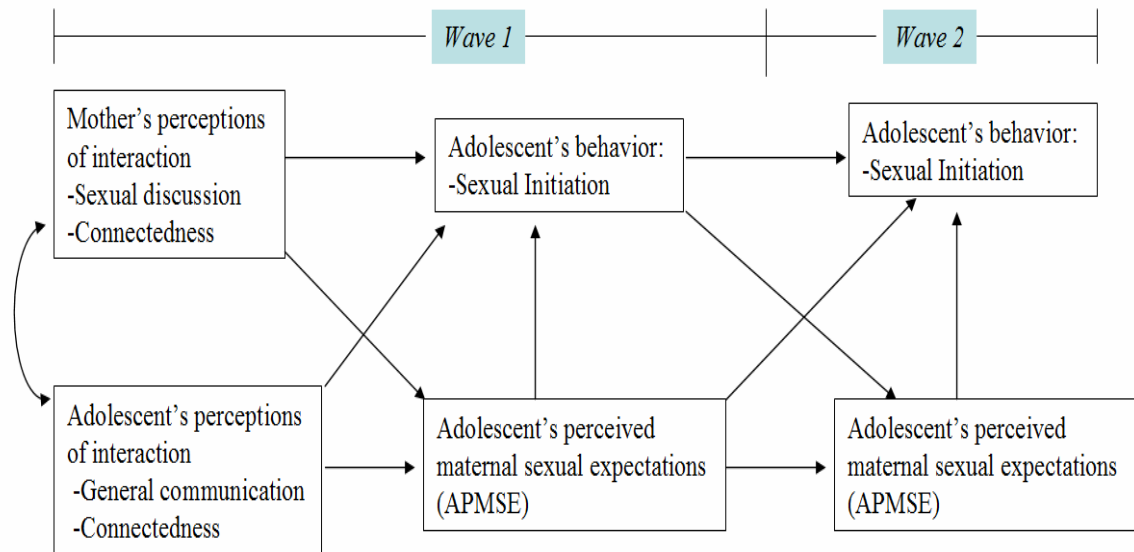


Figure 1: Conceptual Framework

Another important finding from this preliminary work was that even though there were different degrees of acculturation between the mothers and girls, both the mothers and girls expressed their need to hold onto their traditional cultural values because of their minority status and their experiences of being treated differently. For the girls, knowing their traditional culture was a way for them to match how they look to “what they are supposed to be.” On the other hand, the mothers used traditional culture to enhance their daughter’s survival in the U.S. society. Despite different perspectives of cultural values and the fact that few sexual discussions were reported by these mother-daughter dyads, the girls were able to correctly perceive their mothers’ expectations of “not dating” (i.e., remaining abstinent). These girls also reported that the lack of mother-daughter sexual discussion had created tensions in their relationship

and often led the girls to have feelings of loneliness or guilt, especially when they chose to date in spite of their mother's wishes (Kao, 2007). This finding suggests that these girls picked up on their mothers' sexual expectations (not dating) via other nonverbal communications (e.g., general communication). But questions remain about the protectiveness of the perceived maternal sexual expectation and whether it provides AAPI adolescents with knowledge and confidence about practicing safe sex (i.e., condom use) when needed. This is becoming an important issue because according to the U.S. Census (1996), 96% of AAPI children are immigrants or the children of immigrants. Hence, culturally embedded studies and interventions could augment effects in the process of bicultural adaptations. The preliminary study had limited generalizability due to its non-representative sample of the AAPI population and the lack of adolescent males in the sample. This dissertation expanded on the sample for the preliminary study to include AAPI adolescent males and African American, white, and Hispanic adolescents from a representative sample generated from the National Longitudinal Study of Adolescent Health (Add Health) data set (Udry, 1998). The current study could provide the foundation for the next step in a program of research to develop culturally appropriate interventions to improve the sexual health of AAPI adolescents.

Review of the Research Literature

According to the Social Ecological Model, adolescents' sexual behaviors would be influenced by the micro-, meso-, and/or macro-level systems. Although this dissertation could not include all elements in the ecosystem, the literature review is structured in the order of the three levels of ecosystems.

Micro-System

Sexual initiation

Early sexual initiation among adolescents has been the primary risk factor for unplanned pregnancy and sexually transmitted infections (STIs). Although there is great interest in understanding the risk factors associated with adolescents' early sexual initiation, which include biological changes related to pubertal development; social contacts with their parents, family members, peers; and substance abuse (Jaccard, Dittus, & Gordon, 1996; Lammers, Ireland, Resnick, & Blum, 2000; Resnick et al., 1997), there is limited understanding about AAPI adolescents' sexual initiation and their possible risk or protective factors.

Early sexual initiation is associated with risky sexual behaviors such as frequent sexual activity, multiple sex partners, and unprotected sexual intercourse, which increase adolescents' risks of having STIs, cervical cancer, pelvic inflammatory disease, and unwanted pregnancy (Jaccard, Dittus, & Gordon, 1996; Lammers, Ireland, Resnick, & Blum, 2000; Upchurch, Levy-Storms, Sucoff, & Aneshensel, 1998; Watts & Nagy, 2000). Although AAPI adolescents are less likely than African American, white, and Hispanic adolescents to have sexual intercourse, once they become sexually active the associated risky sexual behaviors (i.e., using drugs and/or alcohol or not using a condom at last intercourse) are similar to other ethnic groups (Grunbaum, Lowery, Kann, & Pateman, 2000). Hence, to improve the health behaviors of AAPI adolescents, understanding factors related to early sexual initiation may be an important area of competence for nursing professionals.

Gender

In many Asian cultures, gender is an important factor related to cultural norms defining how adolescents behave. AAPI females may perceive their maternal sexual expectations differently from AAPI males. Because of this difference, when investigating maternal influences among AAPI adolescents, it is important to understand if APMSE is different between AAPI males and females, and whether it can provide the same degree of protectiveness for AAPI males and females.

In addition, traditionally, gender often is a preceding factor for different interpersonal dynamics between mothers and adolescents among many Asian cultures as a result of different traditional cultural expectations about appropriate behaviors for the sexes (Spence & Helmreich, 1978). Some studies (Hahm, Lahief, & Barreto, 2006; Ray-Mazumder, 2001 ; Tang, Wong, & Lee, 2001; Upchurch, Levy-Storms, Sucoff, & Aneshensel, 1998) have suggested that adolescents' relationships with their mothers and their level of acculturation may influence their sexual behaviors differently for males and females. Thus, understanding the gender and acculturation influences on the longitudinal model among AAPI could be an important step toward finding an effective family intervention for this understudied population.

Although a recent hypothesis on gender similarities (Hyde, 2005) tested through meta-analysis studies suggested that males and females behave more similarly than differently, research has consistently shown that in terms of sexual attitude toward casual sex, males are significantly different from females (Oliver & Hyde, 1993). Since there is limited research available to understand gender influences on sexual behaviors of AAPI adolescents, it is important to assess if AAPI females perceive their maternal

sexual expectations differently than AAPI males, and whether APMSE provides the same degree of protection for both AAPI females and males.

Adolescents' Perceived Maternal Sexual Expectation (APMSE)

Adolescents' sexual behaviors often are investigated from an intrapersonal approach (e.g., adolescents' independent decision making about engaging in certain sexual activities). For example, from studies that have used the theory of planned behavior (Ajzen & Madden, 1986; Fishbein, Middlestadt, & Hitchcock, 1991) researchers often identify adolescents' "intentions" as a strong predictor for adolescents' sexual behaviors, while other researchers (Faryna & Morales, 2000; Fisher, Fisher, Williams, & Malloy, 1994) have linked adolescents' sexual attitudes and their sexual behaviors. Although the above intrapersonal approach provides an understanding of the relationship between adolescents' own sexual attitudes and their sexual behaviors, what is unclear and would be of interest to family researchers is how the adolescents form their sexual attitudes, particularly in relation to their interactions with their mothers. In other words, what could be the most important influential elements that the mothers have in terms of delaying adolescents' sexual initiation? Studies have shown (Dittus & Jaccard, 2000; Jaccard, Dittus, & Gordon, 1996; Lammers, Ireland, Resnick, & Blum, 2000; McNeely et al., 2002; Sieving, McNeely, & Blum, 2000) that maternal disapproval of premarital sex has a positive influence on delaying adolescents' sexual initiation.

According to the child contextual developmental model (Balts, 1997; Cairns, 2000; Lewis, 1999), adolescents' behaviors often are formed by learning from others who are close to them such as their parents or peers. Some family researchers have

linked adolescents' sexual behaviors with their relationships with their mothers (Aronowitz, Rennells, & Todd, 2005; Dittus, Jaccard, & Gordon, 1999; Watts & Nagy, 2000) and suggested that adolescents perceived their mothers' sexual expectations (or disapproval) through their interactions with their mothers. Some studies (Foundation, 1996; Whitaker & Miller, 2000) have suggested that although peers' sexual behaviors play an important role in adolescents' decisions to initiate sexual intercourse, parents are the primary source of information about sex, and most importantly, the adolescents are influenced by their parents' attitudes and behaviors. For instance, Lederman and colleagues (2004) found a strong correlation between adolescents' sexual intention and their perceptions of their parent's disapproval of having sex. Furthermore, although there is limited knowledge about how APMSE may affect adolescents' sexual behaviors, studies have shown that parental expectations serve as a protective factor for preventing alcohol use (Hahm, Lahiff, & Guterman, 2003; Lee, Sobal, & Frongillo, 2000) and for promoting academic achievement among AAPI adolescents (Kibria, 2002). Hence, it is possible that APMSE may have a similar effect on AAPI adolescents' sexual behaviors. To test that hypothesis, a latent factor called "APMSE" was constructed and used in the model to understand 1) the determining factors associated with APMSE; 2) whether APMSE could serve as a protective factor for AAPI and other adolescents' sexual initiation; and 3) whether the degree of protection varies among ethnic groups and levels of acculturation.

Meso-System

Mother-Adolescent Interactions

In order to further understand how AAPI adolescents perceive their maternal sexual expectations, it is important to investigate several aspects of the mother-adolescent interactions. For example, many studies have investigated maternal sexual communication and general communication (Chung et al., 2005; DiClemente et al., 2001; DiIorio, Kelly, & Hockenberry-Eaton, 1999; Dittus, Jaccard, & Gordon, 1999; Feldman & Rosenthal, 2002; Fisher, 1987; Guenther-Grey et al., 2005; Jaccard, Dittus, & Gordon, 2000; Jaccard, Dodge, Dittus, Feldman, & Rosenthal, 2002; Widmer, 1997; Wilder & Watt, 2002). Although the findings from these studies were mixed, most studies linked maternal sexual communication with positive sexual behaviors. However, one thing to note is that there is no documented literature investigating the effects of either maternal sexual or general communication in the AAPI population. Similar deficits exist for understanding the potential for the predictive value of AAPI mothers' and adolescents' perceptions of connectedness. This investigation is important because these relationships specify how factors associated with mother-adolescent interactions may influence sexual initiative in AAPI adolescents.

Explicating the possible factors related to mother-adolescent interactions is important because according to the expectancy violation-realignment model (Collins & Luebker, 1994), through interactions, both parent and adolescent constantly realign their expectations (and behaviors) with each other. Hence, it is possible that the adolescents' perceived maternal sexual expectation (APMSE) could be the result of their constant

interactions with their mothers, which can be used to predict AAPI adolescents' sexual behavior. Consequently, by examining how AAPI mother-adolescents' perceptions of interactions might be related to adolescents' perceived maternal sexual expectations (APMSE) and their sexual initiation, we may be able to identify protective elements with the potential for influencing positive adolescent sexual behaviors.

Maternal sexual discussion

One form of mother-adolescents' interactions, maternal sexual discussion, has been suggested as a protective factor for adolescents' risky sexual behaviors (Clawson & Reese-Weber, 2003; Feldman & Rosenthal, 2002; Jaccard, Dodge, & Dittus, 2003; Jaccard, Dodge, Dittus, Feldman, & Rosenthal, 2002). However, little is known about its influences on AAPI adolescents, for whom sex is generally perceived as a "taboo" topic within AAPI family dynamics. From the literature review, support for the relationship between mothers' sexual discussions and adolescents' sexual behavior was mixed. However, in more recent studies, more frequent and positive maternal discussions have been associated with adolescents having fewer sexual partners as well as later initiation of and less frequent sexual activity (DiIorio et al., 2001; Jaccard & Dittus, 2000; Jaccard, Dodge, & Dittus, 2003; Jaccard, Dodge, Dittus, Feldman, & Rosenthal, 2002; Miller, 2002; Whitaker & Miller, 2000). For example, Whitaker and Miller (2000) found that peer norms were more strongly associated with risky sexual behavior for those adolescents who had not discussed sex or condom use than for those who had such discussions with their mothers. On the contrary, Widmer (1997) found negative associations between mothers' sexual discussions and adolescents' sexual behaviors. One possible explanation of this negative correlation could be that the

mothers might decide to talk with their children after learning about their sexual or impending sexual activities. Hence, other factors, such as the timing and the mothers' manners when having sexual discussions could be influential in understanding these research findings (Widmer, 1997).

Although some disagreements remain in the literature about the effectiveness of maternal sexual discussions and the onset and frequency of adolescent intercourse, most research demonstrates consistent and positive links between maternal sexual discussion and adolescents' condom use for sexually active adolescents. For African American (AA) and Hispanic adolescents, in depth and more frequent sexual discussions with their mothers are positively associated with condom use (Crosby et al., 2002; DiClemente et al., 2001; Richards, 2004). Furthermore, many researchers (Jackson, Bijstra, Oostra, & Bosma, 1998; Miller, Kotchick, Dorsey, Forehand, & Ham, 1998) suggested that in order to facilitate sexual discussions between mothers and adolescents, measures of such interactions should cover not only what is discussed, but also how the information is conveyed. In order to develop effective family intervention programs to delay adolescents' sexual initiation, understanding how mothers and adolescents interact in terms of forming adolescents' sexual attitudes (or the expectations for each other) is essential.

Adolescents' perceptions of general communication

Besides maternal sexual discussion, some researchers have investigated mother-adolescent interaction using general communication as an indicator for their relationship. For example, in one study (Miller, Kotchick, Dorsey, Forehand, & Ham, 1998) with 907 AA and Hispanic families in three locations (Alabama, New York, and

Puerto Rico), the mother-adolescent relationship (as measured by the general communication between mother and adolescent) was a good predictor for adolescents' level of sexual behaviors. In the same study, maternal monitoring and maternal sex attitudes (as a proxy for expectations) emerged as significant predictors for adolescents' sexual behavior, whereas the family structural variables (as measured by family income, parent education, and maternal marital status) failed to predict adolescents' sexual behaviors. One of the important findings was that maternal attitudes (expectations) were more strongly related to adolescents' sexual activities in the Puerto Rican sample than in adolescents in Alabama and New York; this suggests that other family factors, such as the different cultural values, acculturation experiences, and language variations might have influenced the sexual behaviors in the Puerto Rican adolescents.

The lack of any documented study examining AAPI adolescents' perceptions of the maternal control process, such as perceived maternal sexual expectations (APMSE), provides support to move beyond a Western cultural perspective to understand maternal expectations in Asian cultures. For instance, Shek and Chan (1999), who framed maternal expectation as part of the maternal control process, suggested that traditional Chinese parents expect their children to have attributes such as obedience, good character, and other virtues, and not bring dishonor to the family name. The expectations of respecting parents, honoring the family name, and preserving harmony are emphasized heavily in many Asian cultures. Consequently, indirect (general) communication might be a predominant way for AAPI mothers to express their expectations. Furthermore, mismatched expectations between AAPI mothers and their adolescents might create conflicts or tensions in their relationship. Hence, when

assessing AAPI adolescents' sexual behaviors, family variables determining APMSE and the possible consequences of mismatched sexual expectations as a result of mother-adolescents' interactions (e.g., mother's and adolescent's perceived connectedness) are important.

Connectedness: mothers' and adolescents' perspectives

Parents generally are considered to be the primary influence on their adolescents' sexual attitudes and values (Whitaker & Miller, 2000). Research has shown that although adolescents' sexual attitudes are more permissive than those of their parents, the attitudes of parents are reflected in their adolescents' sexual attitudes and behaviors (Jaccard, 1977; Jaccard, Dittus, & Gordon, 1996; Thornton & Camburn, 1987). Besides direct sexual discussion between mothers and adolescents, some studies have suggested that the quality of the mother-adolescent relationship (i.e., satisfied relationship and perceived connectedness) is strongly associated with communication patterns and adolescent sexual behaviors (Bennett, Contessa, & Turner, 1999; Foundation, 1996; Kim, Conger, & Lorenz, 2001). Several studies (Crosby et al., 2001; Jaccard, Dittus, & Gordon, 1996; Kalmuss, Davidson, Cohall, Laraque, & Cassell, 2003; Markham et al., 2003) have indicated that the parent-adolescent relationship can be very important in determining adolescent sexual behaviors. For example, Markham and colleagues (2003) found that adolescents who perceived a higher level of family connectedness were less likely to report ever having had sex, having unprotected sex, and/or having been involved in a pregnancy. Similarly, Crosby and colleagues (2001) found that female African American adolescents who live with their mothers in a perceived supportive family were more likely to discuss sexual risk with their partner

and less likely to report sex with an unsteady partner or to engage in unprotected sexual activities.

The connectedness (and/or the supportive relationship) between an AAPI mother and her adolescent may be a protective factor related to adolescents' risky sexual behavior. In order to delineate satisfaction with the AAPI mother-adolescent relationship, it is important to separately examine AAPI mothers' and adolescents' perceptions of connectedness. This approach could better reflect how AAPI mother-adolescent interactions may be related to how adolescents perceive their mothers' sexual expectations and how this may relate to their age of sexual initiation. This inquiry is important because research has shown that adolescents are frequently unaware of their parents' beliefs and attitudes about sex-related issues despite their engaging in sex-related conversations with their parents (Feldman & Rosenthal, 2002; Guzman et al., 2003; Jaccard, Dittus, & Gordon, 2000; Jaccard, Dodge, & Dittus, 2003; Jaccard, Dodge, Dittus, Feldman, & Rosenthal, 2002; Jackson, Bijstra, Oostra, & Bosma, 1998). Parental sexual expectations and sexual disapproval may be conveyed through other indirect interactions with their adolescents, such as general communication and mother-adolescents' perceived connectedness or support. Likewise, AAPI mothers' perception of connectedness may be an important reflection of the mother-adolescent relationship. For instance, Baumrind suggested that authoritative parents, who are both highly demanding and responsive (e.g., parents with warm and supportive attitudes), were most successful in protecting their adolescents from drug abuse (Baumrind, 1996; Baumrind, Cowan, & Hetherington, 1991).

Correspondingly, Hahm and colleagues (2003) found Asian American parental attachment is protective against adolescents' alcohol use.

Macro-System

Acculturation

Studies from various acculturation models (Berry, 1985; Berry, Kim, Boski, Kim, & Gudykunst, 1988; Dressler & Bernal, 1982; Roysirca-Sodowsky & Maestas, 2000) often link the level of acculturation with immigrants' health behaviors. For example, indicators show that as AAPI become more acculturated to the mainstream American culture, their health attitudes and sexual behaviors become more similar with the White American norm (Okazaki, 2002). Although majority society exerts pressure for immigrants to conform to majority societal norms, different cultural values in the home may have varying degrees of impact on their health behaviors. Several studies (Lebra, 2000; Murthy, 1998; Rothbaum, Pott, Azuma, Miyake, & Weisz, 2000) have shown that Asian American adolescents more frequently reported less maternal warmth and acceptance than their White adolescent peers. Murthy (1998) further suggested that Asian parents focus primarily on their children's economic future, rather than on their overall psychological development. For instance, Murthy suggested that the inadequate sexual communication in many Asian Indian immigrant households may lead to severe tension between parents and adolescents when the young people demand freedom to date and choose their spouses. Additionally, acculturative stress may occur when an individual's adaptation resources are not sufficient to support adjustment in a new

environment (Dressler & Bernal, 1982). Hence, when assessing AAPI adolescents' sexual behaviors, acculturation influences need to be considered.

Although the components of acculturation are very broad, studies (Berry, Kim, Boski, Kim, & Gudykunst, 1988; Dressler & Bernal, 1982; Hahm, Lahiff, & Guterman, 2004; Hyman & Dussault, 2000; Lee, Sobal, & Frongillo, 2000) have suggested that some individual demographic and social characteristics are related to the process of acculturation, including age, gender, socio-economic status, length of residence in the host country, and/or their ability to speak the host language. For example, acculturation was measured by language spoken at home when Hahm and colleagues (2004) found an association between the level of acculturation and binge drinking and the onset of first sexual intercourse (Hahm, Lahief, & Barreto, 2006) among Asian American adolescents.

Usually, the level of acculturation is assessed by fluency with the host country language, place of birth, length of residence, and/or the self-reported social identification (Hahm, Lahief, & Barreto, 2006; Hahm, Lahief, & Guterman, 2003; Hahm, Lahiff, & Guterman, 2004; Hayman, 2002; Lee, Sobal, & Frongillo, 2000). Although there is limited understanding about what are the best components to represent level of acculturation, the language spoken at home and the length of residence in the host country are consistently identified and used as important variables determining the level of acculturation (Hahm, Lahief, & Barreto, 2006; Hahm, Lahiff, & Guterman, 2004; Hayman, 2002). The longer the immigrant remains in the host country, the more likely he/she is to pick up the cultural values of the host country, which could be reflected in their decisions on which language to speak at home; more

acculturated individuals are more likely to use the host country language. Although these two variables may not represent every aspects of acculturation, they could be used to reflect some degrees of acculturation.

Family Ethnic Backgrounds

The contextual and environmental influences on adolescents' health behaviors are enormous, especially in relationship to their cultural identification, which is closely connected to their family ethnic backgrounds (Elder, 1995; Fong, 2004; McAdoo, Martinez, Hughes, & Klein, 2006; Pantin, Schwartz, Sullivan, Prado, & Szapocznik, 2004). In the United States, new pictures of ethnic families are emerging from the increasing diversity among families. Family researchers are facing challenges to develop accurate and timely knowledge about ethnic families, particularly for families that often need to face the challenges of parenting at two levels—inside their own culture and outside in the larger culture. Professionals in the field of child development describe this process as biracial socialization (McAdoo, Martinez, Hughes, & Klein, 2006). Bicultural studies (Moreau, 1996; Spira, Grossman, & Wolff-Bensdorf, 2002; Willgerodt, Miller, & McElmurry, 2002) gave us a glimpse of how individuals internalize the values of new culture with those of his/her home culture. However, the family researcher has limited understanding about how AAPI families function in terms of promoting their adolescents' sexual health, due to limited research with AAPI adolescents and their families. AAPI adolescents' sexual health behaviors generally are assumed to be similar to that of white adolescents because of their comparable educational and economic backgrounds. However, the lack of focus on possible cultural influences in their homes might place these understudied AAPI adolescents in a

further disadvantaged position. When comparing AAPIs to other ethnic groups, we could elucidate the possible differences among the ethnic groups. Thus, this investigation could bridge the knowledge gap in the area of sexual health for AAPI adolescents and potentially be able to facilitate understanding from studies in other ethnic groups. This analysis is significant because AAPI adolescents are in a transitional period of receiving influences (an imprint of their particular social worlds) from the environments in which they have lived, such as from their immediate family and society (Elder, 1995).

The AAPI population is one of the fastest growing in the United States (APIAHF, 2007). However, because of myth of being a trouble-free “model minority,” limited available information is impeding our understanding about the family influences on AAPI adolescents’ sexual health. An important step to understand factors associated with AAPI adolescents’ sexual behaviors is to recognize the similarity and variation between AAPI and that of other ethnic groups. This inquiry can advance our knowledge about factors related to AAPI adolescent sexual health and aid us to develop and provide effective intervention programs to encourage healthy sexual behaviors among this group.

Summary of the Literature Review

A gap noted from the research literature is the limited understanding of which interpersonal factors between AAPI mothers and adolescents influence the adolescents’ sexual health behaviors and the mechanisms by which they do so. Based on the above review of literature with mostly non-AAPI populations, adolescents’ sexual behaviors have been studied from a Western individual perspective (i.e., focusing more on one’s

self-efficacy); more recent family studies have investigated adolescents' sexual behaviors from the viewpoint of promoting family sexual discussions. Very few studies have incorporated family-centered cultural values to examine adolescents' sexual behaviors and their relationship to how adolescents perceive their mothers' sexual expectations. Due to the small education and economic gaps between AAPI and White (Commerce, 2000), AAPI adolescents' sexual behaviors often were assumed to be similar to those of their White peers. However, because of the cultural emphasis on family-centered and modesty values among AAPIs (Mo, 1992), AAPI adolescents often have to face bicultural straddling on a daily basis. Living within two cultures in one society could profoundly affect the growth and development of these adolescents (Willgerodt, Miller, & McElmurry, 2002). Hence, it is important to examine and compare the differences in 1) how AAPI and other ethnic adolescents perceive the sexual expectations from their mothers, and 2) how the degree of protection of APMSE varies among these different cultures. Thus, the purpose of this research project is to understand the relationships among variables that explicate AAPI mothers' and adolescents' perceptions of their interactions, APMSE, and adolescents' sexual behaviors. Additionally, this study seeks to understand how AAPI adolescents' experiences of bicultural straddling may influence their sexual behaviors differently from other adolescents. In summary, in order to expand the growing body of health research regarding AAPI adolescents, studies of bicultural straddling and its influences on mother-adolescent's interactions are required so that intervention models may be developed that reflect the unique needs of this population.

Methods

Design

This study is a secondary analysis of the nationally representative, longitudinal Add Health dataset (Udry, 1998) across two waves of data to examine how AAPI adolescents' age at first sexual initiation is related to intra- and interpersonal influences (mother-adolescent) and how the interpersonal dynamics might differ compared to other ethnic groups, namely African Americans (AA), Whites, and Hispanics.

Data Source: Add Health Dataset

The National Longitudinal Study of Adolescent Health (Add Health) is a nationally representative study that explores the causes of health-related behaviors of adolescents in grades 7 through 12 and their outcomes in young adulthood. Add Health is designed to examine how social contexts (families, friends, peers, schools, neighborhoods, and communities) influence adolescents' health and risk behaviors. This Add Health research was supported by grant P01-HD31921 from the National Institute of Child Health and Human Development. Data collection began with an in-school questionnaire administered to a nationally representative sample of students in grades 7 through 12. The study follows up with a series of in-home interviews of students approximately one, two, and six years later (Waves 1, 2, and 3). One of uniqueness of this research designs is examining adolescents in context (Udry, 1998). In this dataset, Waves 1 and 2 examine the forces that may influence adolescents' behavior, in particular, personal traits, families, friendships, romantic relationships, peer groups, schools, neighborhoods, and communities. Data in Wave 3 were not included

in this analysis because many maternal variables were not assessed in the Wave 3 interview.

The Social Ecological Model was used as the underlying theoretical framework to guide this analysis. However, due to its complexity, not all elements from the whole ecosystem were examined. For example, some concepts from the meso-system (e.g., bicultural straddling) were very difficult to examine; hence, this study only focused on elements that were available at micro-, meso-, and macro- system levels. The relationships between independent variables and dependent variables were examined over two time periods, Wave 1 (09/94–12/95) and Wave 2 (04/96–08/96). A longitudinal design was used to examine the relationships among mothers' and adolescents' perceptions of their interactions, APMSE and adolescents' age at first sexual initiation at Wave 1 and Wave 2 using Structural Equation Modeling (SEM) (Figure 2). Multiple models were explored to understand the relationships among AAPI adolescents' gender, the levels of acculturation (Figure 3), the variations of adolescents' cultural backgrounds at home, APMSE, and adolescents' first sexual initiation at Wave 1 and Wave 2.

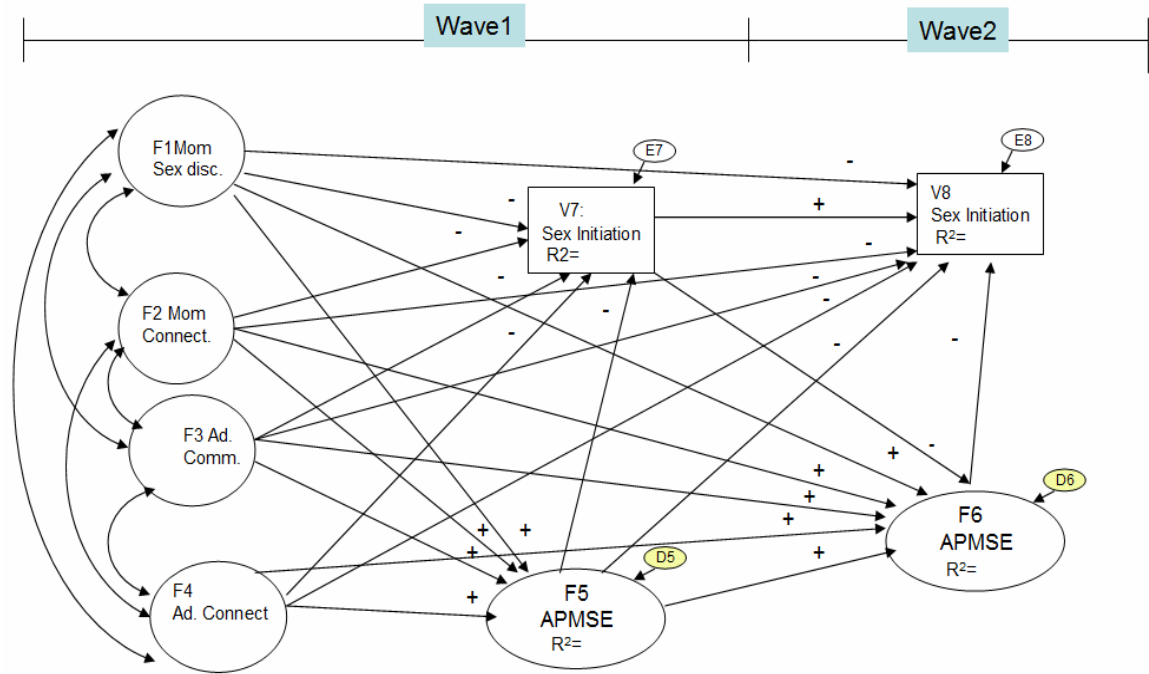


Figure 2: The Hypothesized AAPI Base Model

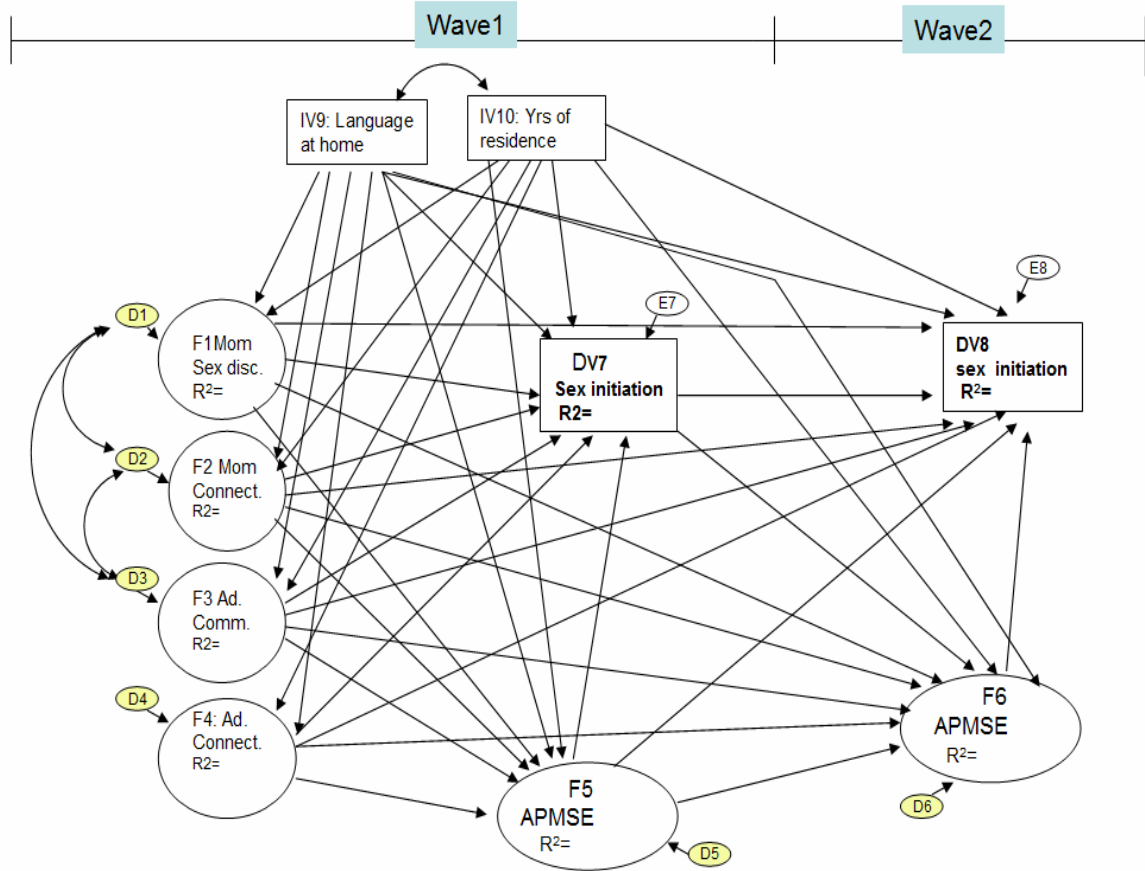


Figure 3: The Covariate Acculturation Model

Sample Selection

The nationally representative longitudinal Add Health data set was selected for the secondary analysis because it includes 20,745 youths who were interviewed in their homes, including 1,584 AAPI adolescents and one of their parents. The restricted-use dataset was chosen to retrieve variables that pertain to mothers' and adolescents' perceptions of interactions, APMSE, and their age at first sexual initiation. The Add Health data set is funded by the National Institute of Child Health and Human Development (Udry, 1998) with large randomly selected diverse samples. The inclusion criteria for this project include adolescents (AAPI, African Americans,

Whites, and Hispanics) who had completed the Wave 1 and Wave 2 in-home interviews, whose ages were between 15 and 17 (at Wave 1), and whose mothers had participated at Wave 1 in-home interview. Adolescents who were younger than 15 years old are excluded because many sex-related questions only were asked with the adolescents older than 15 years at Wave 1. Furthermore, according to the literature (DiClemente et al., 2001; Grunbaum, Lowery, Kann, & Pateman, 2000; Schuster, Bell, Nakajima, & Kanouse, 1998), AAPI adolescents tend to delay the onset of their first sexual intercourse compared to other ethnic groups. Therefore, including only older adolescents is more salient and appropriate for the purpose of this study. Adolescents who were older than 17 years (grade 12) at Wave 1 were excluded because adolescents who had finished high school (mostly of 18 years and older at Wave 2) were not included in the Wave 2 interview. The exclusion criteria for this project were 1) the adolescents who do not have their mothers' participation at Wave 1; 2) adolescents with inconsistent report (i.e., having sex prior to the date of their birth); and 3) the adolescents who reported their sexual initiation prior or equal to 10 years old. The rationale of eliminating adolescents whose first sexual initiation was before/at age 10 is because that sexual intercourse at such early age is likely to be non-consensual sex.

The overall response rate for Waves 1 and 2 was 79% (from school questionnaires to W1 in-home interview) and 88% (between 2 in-home interviews), respectively. Attrition is not a major concern in this secondary analysis because the response rates at Wave 2 were about 88%. The rationale to include only mothers in the study is that mothers were the preferred parent for this in-home interview. Also, research (Miller, Kotchick, Dorsey, Forehand, & Ham, 1998) shows that mothers

consistently are identified as the primary parent for providing sexual discussion in AA and Hispanic families. Family-focused AAPI mothers also play an important role in providing education to their children (Shek, 2001a, 2001b, 2005). Therefore, to include only mothers in the analysis is justified. One needs to note that although 713 AAPI adolescents had completed both Wave 1 and Wave 2 interviews, only 465 mothers had completed the in-home interview at Wave 1. Since all interviews were conducted in English, it is possible that some AAPI mothers were not able to participate because of language barriers. Other family members (i.e., fathers or grandparents) who completed the parental section were not included in this analysis because the main focus of this study was to assess maternal influences. Since both mothers' and adolescents' perceptions of their interactions were required for analysis, the available AAPI adolescents that fit into inclusion criteria were somehow restricted.

The sample selected for the secondary analyses consists of 7,638 adolescents ages 15–17 and their mothers. Among them, there are 433 AAPI; 1,367 AA; 4597 white; and 1,241 Hispanic adolescents (Table 1). The sub-sample of AAPI adolescents (N = 433) was used as the center group for all model testing. The sub-samples of AAs, whites, and Hispanics were only used in the comparison models, which will be discussed extensively in Chapter III.

Table 1: Adolescents' Age and Gender of Each Ethnic Group

	AAPI		AA		HA		white	
	Male	Female	Male	Female	Male	Female	Male	Female
15 yo	59	57	171	296	187	210	761	851
16 yo	92	81	226	293	229	236	833	837
17 yo	72	72	147	234	185	194	673	642
Subtotal: N	223	210	544	823	601	640	2267	2330
Percentage	51.5%	48.5%	39.8%	60.2%	48.4%	51.6%	49.3%	50.7%
Total	433 (5.7%)		1367 (17.9%)		1241 (16.2%)		4597 (60.2%)	

The sample selection for each subpopulation is based on the same inclusion and exclusion criteria. Since AAPI was the smallest subgroup of this secondary data analysis, a preliminary frequency analysis was conducted to assess for adequate power. A preliminary power analysis indicated a sample size of 127 would have power of 80% with medium effect size ($R^2=.15$) and $\alpha<.05$ with 12 predictors for multiple regression analysis. For SEM analysis, a rule of thumb parametric estimation also was performed to determine adequate sample size. Minimal sample sizes of 180 and 300 subjects are suggested to run the base AAPI model (Figure 2) (36 parameters) and the covariate model (Figure 3) (60 parameters), respectively, based on Bentler and Chou's suggestion (1988) that a minimum of 5-10 cases respectively per parameter is necessary for the model testing. Thus, there were sufficient numbers of subjects across the two waves of data to provide adequate power for the proposed longitudinal analyses. Missing data (about 10% of cases) will be handled with the built-in pair algorithm (EQS 6.1 for Window). Although, in this secondary analysis, AAPI were combined as one group, this does not assume that AAPIs are a homogeneous group. On the contrary, AAPIs are a heterogeneous group that includes at least 49 various subcultures. However, due to the small sample size of each subgroup, it was not feasible at this time to divide this heterogeneous group for analysis. It would be important for future study to investigate differences among subgroups of the AAPI population. The purpose of this research project, however, is to use the selected AAPI samples to explore possible differences with other ethnic groups; the model used for testing was built upon a preliminary study that was based on one of the AAPI subgroups. Although combining AAPIs as a group is not ideal, the explorations and comparisons conducted in this project could help

nursing professionals to understand maternal influences on AAPI adolescents' sexual initiation and the possible differences compared to various ethnic groups

Measures

For measures of the major variables (Table 2), scales were constructed based on items in the restrict-use data set. Items were selected to assess latent factors, including mothers' perceptions of sexual discussion and connectedness and adolescents' perceptions of general communication and connectedness as well as APMSE at Wave 1 and Wave 2 (Figure 2). Two single-item variables were used in this longitudinal model as dependent variables to assess adolescents' age at first sexual initiation at Wave 1 and Wave 2. Content validity of the items was established by the calculation of a content validity index (CVI) (Waltz, Strickland, Lenz, & Waltz, 2005) followed by reliability testing. Four latent exogenous factors were constructed to assess mothers' and adolescents' perceptions of interactions. The effects of these four factors on APMSE and adolescents' age at first sexual initiation were assessed at both at Wave 1 and Wave 2. Among these four latent factors, two were obtained from mothers (i.e., mothers' perceptions of sexual discussion and connectedness with their adolescents) and two factors were obtained from adolescents (i.e., adolescents' perception of general communication and connectedness with their mothers). For the latent factors, multiple items were standardized and the mean values were obtained as one single indicator. Please see Table 2 for selected items. According to Muthen's suggestion for modeling designs using continuous/categorical variable methodology, fewer than five categorical variables are recommended when using categorical variables as indicators in the same

model (Kline, 2005; Muthén & Kaplan, 1985). Four categorical variables were used to form the exogenous latent factor of “adolescents’ perceived general communication.”

Adolescents’ sexual initiation was calculated by several items. For example, a question to assess whether adolescents were sexually active was used to establish the baseline information about adolescents’ sexual status. The onset of first sexual initiation was calculated by adolescents’ self reported date of sexual initiation. Some cases were eliminated from analysis if there were inconsistent report (i.e., sexual initiation date was prior to their date of birth or after the interview date) and if their self-reported sexual initiation was before/at age 10 (one of the exclusion criteria). To establish content validity of the selected scales, items were compared with those on existing scales that measure similar constructs. Selected items also were assessed for validity and reliability by going through a review of the published articles using the same Add Health data set. For instance, based on a cohort of 2006 mothers of 14 to 15-year-old adolescents, McNeely (2002) found adequate internal consistency ($\alpha = .78$) using a similar 4-item scale to assess mothers’ sexual discussion. See Table 2 for preliminary selected items and preliminary reliabilities of each latent factor, which range from .588 to .851. The low alpha (.588) is noted and will be handled vigilantly in SEM model testing. A more conservative alpha was assigned to calculate its error term. Since structural equation modeling considers imperfect error measurement, it is acceptable to use items with less ideal alpha.

Table 2 : Measure

	Constructs	Scales and Psychometric Properties	Items
Independent Variables	F1: Mothers' Perceived Sexual Discussion	1= not at all, 4=a great deal 1=strongly agree"; 5="strongly disagree ($\alpha=.825$)	<ul style="list-style-type: none"> How much have you and your child talked about him/her having sexual intercourse and the negative things that would happen if (he got someone/got) pregnant? The dangers of getting sexually transmitted diseases? How much have you talked to your child about sex? 1 = not at all, 4 = a great deal It would be difficult for you to explain things if you talked with your child about sex and birth control? 1= SA 5= SD
	F2: Mothers' Perceived Connected	1=always, 2=often, 3=sometimes, 4=seldom; 5=never ($\alpha=.626$) ~reverse coded	<ul style="list-style-type: none"> ~Do you get along with him/her well? ~Do you and he/she make decisions about his/her life together? ~Do you feel you can really trust him/her?
	F3:Adolescent s' Perceptions of General Communicati	1=Yes; 0=No (categorical variables) ($\alpha=.588$)	In the past 4 weeks, do you have the following activities with your Mom <ul style="list-style-type: none"> Talking about a party you went to; Talking about a personal problem; Talking about school work (or grade); Talking about other things you are doing in school.
	F4: Adolescents' Perceptions of Connectedness	(1 = "not at all" 5 = "a great deal") (1= strongly agree, 5= strongly disagree) ($\alpha=.851$) ~reverse coded	How close do you feel to your mother? 1= not at all 5= a great deal <ul style="list-style-type: none"> ~Most of the time, your mother is warm and loving toward you? 1=SA, 5=SD ~Are you satisfied with the way you and your mother communicate with each other? 1=SA, 5=SD ~Overall, are you satisfied with your relationship with your mother?
Dependent variables	DV7 & DV8 Adolescents' age at first sexual initiation	WAVE1 (1-7): 1= no sex, 2= 17yrs, 3=16yrs, 4=15yrs, 5=14yrs, 6=13yrs, 7=11,12 years WAVE2 (1-8): 1= no sex, 2= 18yrs, 3=17yrs, 4=16yrs, 5=15ys, 6=14yrs, 7=13 years, 8=11, 12 years	Calculating the age of their first sexual initiation: <ul style="list-style-type: none"> Have you ever been sexually active? (1=yes, 0 = no) In what month [and year] did you have sexual intercourse for the very first time? In what month [and year] were you born? Interview date?
	F5 & F6: (adolescents) APMSE	1= strongly disapprove; 5=strongly approve 1 = Strongly agree; 5= strongly disagree ($\alpha=.790$ at Wave1; $\alpha=.799$ at Wave2) ~reverse coded	~How would your mom feel about you having sex at this time in you life? ~How would your mom feel about you having sexual intercourse with someone who is special to you and you know well--like a steady girlfriend/boyfriend? 1= Strongly Disapprove 5=Strongly Approve ~If you had sexual intercourse, would it upset your mom? 1=Strongly agree; 5= strongly disagree

A binary logistic regression was performed to compare any differences in exogenous variables between the included and excluded group. Table 3 summarizes the

odds ratio of being selected into the inclusion (at both W1 & W2) or exclusion group (only at Wave1). In AA and AAPI groups, there were no significant differences between selected and unselected samples. However, there are some significant differences noted between selected and unselected group in answering V4 and V 8 for HAs; and V6, V7, and V10 for whites.

Table 3: Comparison of Included and Excluded Sample among All Groups

	AAP I	AA	HA	Whites
Covariate	OR	OR	OR	OR
V1: : Extent of discussion: negative things	.846	.932	.931	.933
V2: Extent of discussion: STIs	.968	1.042	.922	.964
V3: Degrees of discussion: about sex	1.136	1.035	1.097	1.012
V4: Sex discussion: difficult to explain	1.072	.971	1.130*	1.064
V5: Getting along well	1.070	1.018	1.010	.909
V6: Making decisions together	1.234	.936	1.041	1.100*
V7: Can really trust adolescents	.845	1.083	1.062	1.087*
V8: Talking about party you attended	.706	.985	.761*	.931
V9: Talking about personal problem	.869	1.053	.869	.995
V10: Talking about school work or grade	.655	.880	1.086	1.174*
V11: Talking about other things you do in school	.812	1.133	.939	.977
V12: : How close do you feel to your mother	.885	1.018	1.058	1.029
V13: Your mom is warming and loving toward you	1.154	1.036	1.079	1.093
V14: Satisfied with the way of communication	.998	.914	.944	.938
V15: Satisfied with relationship	1.122	1.067	1.072	1.049
Constant	1.561	1.564	.814	1.121

Note: binary logistic regression was performed to detect differences between included and excluded samples. Odd ratio (OR) was computed from unstandardized estimated of regression coefficients.

*P<.05

For HAs, the excluded mothers reported a higher degree of difficulty in explaining about sex (V4). Moreover, the excluded HA adolescents were less likely than the included adolescents to talk with their mothers about parties they had attended (V8). For whites, the included mothers were more likely to report their joint decision making with their adolescents (V6) and their capability to really trust their adolescents (V7) than those of excluded mothers. Also, the included white adolescents were more

likely than excluded adolescents to talk with their mothers about school works or grade. Given the fact that the excluded adolescents were mostly not available at Wave 2 and some reported having an early sexual initiation (on/before age 10), the variations between included and excluded group were at a minimum level.

Procedures

Prior to conducting the secondary analysis, approval for exemption was obtained on March 21, 2007, from the Health Science Human Subjects Review Committee at the University of Michigan (HUM00011883). The samples of the subsets for AAPI and other ethnic groups (AA, white, and Hispanic) were constructed using the same inclusion and exclusion criteria. Missing data were handled using the built-in pair algorithm of EQS. Assessment was performed to ensure that those with missing data (7%) were not different from those subjects with complete data. To begin this secondary data analysis, a descriptive analysis of the sample was examined for possible confounders and to evaluate the differences between the subjects who were retained in the sample and those who were lost to the study, as well as between cultural groups. Five steps of structural equation modeling were used to guide the model testing; these were the validation of the measurement model, model specification, parameter estimation, testing fit and model modification.

Hypotheses were tested with different SEM models. For example, in Chapter II, the AAPI base model (Figure 2) was used to test the relationship between AAPI mother and adolescent's interactions, adolescents' perceived maternal sexual expectation (APMSE), and adolescents' age of sexual initiation. In Chapter III, three comparison models, which were derived from the AAPI base model, were investigated for possible

ethnic differences in maternal influences on adolescents' sexual behavior using AAPI as the axial group. In Chapter IV, gender and acculturation variables were treated as covariates and added to the base AAPI model to test gender and acculturation influences on the overall AAPI model. In addition, a gender comparison model was employed to examine potential differences between AAPI adolescent males and females.

Analysis

A variety of methods were used to validate selected items. For example, the scales/measures were created according to the conceptual framework. Studies using the same dataset were reviewed as references for item selection. Content validity was assessed by cross comparison with existing instruments and further examined by several experts in fields of Nursing and Public Health (i.e., Dr. Carol Loveland-Cherry; Dr. Barbara Guthrie; Dr. Cleopatra Howard Caldwell; and Dr. Jersey Liang). Preliminary reliabilities were compared with those published in the literature for each scale. Confirmatory and exploratory factor analyses were employed to assess the validity of selected scales. Bivariate correlations were assessed to examine relationships between variables. Once the measurement model had been confirmed, a sequence of hypothesized models was analyzed with SEM using EQS for Windows 6.1. Maximal likelihood estimation and robust procedure were used in the analyses because it assumed continuous distribution of endogenous variables and allowed for dichotomous exogenous variables.

Multilevel analyses were not performed in the model because of the limited AAPI sample size and because the cluster variable was not the main focus of this study.

The regional variable was not included in the analysis because of the following reasoning. First, a similar factor (adolescents' cultural backgrounds at home) was included in the analysis and delineated at Chapter III; second, to include regional variable in the model testing, transferring to multiple categorical variables are required. However, since including more categorical variable was not recommended and the specification to treat this variable as a categorical variable was not comparable with the robust procedure (Bentler, 2006), the regional variable was not included in this analysis.

According to Muthen and Satorra's suggestion (1995) about aggregated modeling, special adjustments were done using ME= ML, ROBUST procedure (EQS manual, p. 268). Since there was a restriction on using the maxima likelihood procedure along with setting the specification of categorical variables and the robust procedure at the same time, the regional variable (in the format of categorical variable) was not included in the analysis. This exclusion did not imply the insignificance of environmental effect. Instead, we have recognized and reported the important environmental influences in the preliminary study (Kao, 2007). However, due to limitations of the EQS software, the regional variable was not included in the analyses.

Four indices, Satorra-Bentler chi-square, Non-normed Fit Index (NNFI), Comparative Fit Index (CFI) and root mean square error of approximate (RMSEA) were used to assess the fit and misfit of the data to the model. The weight data was not used in the analysis for the following reasons. First, although there is a consensus for weighting data in generalizing descriptive statistics for targeted subpopulations, there is no agreement in multivariate analyses (Gelman, 2006). Since our axial group (APIs) only represent a small portion (3%) of the Add Health sample (N=13,568 at Wave 2) for

analysis, adjusting weight for over-sampled AAPI (or the non-responsive rate) would not necessary produce un-biased inferences. Second, many of the attributes (e.g., ethnicity, school cohort, or regional cohort) were based on controls for unequal selection probabilities. When sampling weights were used only for a function of independent variables included in the model, using un-weighted data is probably better because the un-weighted estimates are unbiased, consistent and have much smaller standard errors than weighted estimates (Winship & Radbill, 1994). Third, we performed analyses using both weighted and un-weighted data and the results of analyses were very similar between un-weighted and weighted estimates (using normalized weight procedure in EQS 6.1); hence, the un-weighted estimates were used in the model testing.

Furthermore, the proportion of observed variance explained by the model (R^2) for each outcome variable (Wave 1 and Wave 2) was assessed. The unstandardized and standardized estimations were assessed for the significance and strength of the relationships (path coefficients). An additional covariate structural equation model was examined to assess the influences of acculturation, using variables such as the years of U.S. residence, and language spoken at home as covariates. Furthermore, comparison models were explored to assess group differences (i.e., AAPI vs. AA; AAPI vs. white; and AAPI vs. Hispanic adolescents). In addition to the comparisons between AAPI and other ethnic groups, a gender comparison model of AAPI was completed and delineated in Chapter IV to understand the variations of maternal influences between sexes among AAPI.

SEM analysis was selected for this secondary analysis because SEM allowed hypothesized latent variables that provided a way to take account of imperfect score reliabilities (Kline, 2005). Using latent factors was advantageous for this project, partly because some of the concepts were not well identified. For example, the measurement for adolescents' perceived maternal sexual expectation (APMSE) has not been developed or identified as a predictor for adolescents' sexual initiation although some related concepts (i.e., maternal sexual attitude or disapproval) has shown positive associations with adolescents' sexual behaviors (Dittus & Jaccard, 2000; Lammers, Ireland, Resnick, & Blum, 2000; McNeely et al., 2002; Sieving, McNeely, & Blum, 2000). Using SEM allowed us to identify factors related to this concept (through factor analysis) and to test its significance in the path model.

Specific Aims

Aim 1:

To explore the relationships among AAPI mothers' and adolescents' perceptions of interactions, APMSE, and adolescents' first sexual initiation, we hypothesized that 1) mothers' and adolescents' perceptions of their interaction is positively related to APMSE, and 2) negatively related to adolescents' age at first sexual initiation at both Waves. We also hypothesized that APMSE acted as a protective factor for adolescents' age at first sexual initiation both at Wave 1 and Wave 2; and 3) APMSE at Wave 1 serves as a mediator for the effects of mothers' and adolescents' perceptions of their interactions on adolescents' age at first sexual exposure at Wave 2. To test these hypotheses, SEM was used to assess the relationships (i.e., significance and

standardized estimations) among study latent factors and variables. First, the initial measurement model focused on the confirmatory factor analysis (CFA) with six factors only, followed by a full structural longitudinal model to illustrate the relationship between exogenous and endogenous variables. In the structural model, a composite factor was formed for each factor using standardized mean scores. Second, fit and misfit of the model were assessed using the indices of NFI, NNFI, CFI, and RMSEA. Due to the inclusion of categorical variables in the model, using the pair algorithm to handle missing data, and the necessity for using the robust procedure to adjust for aggregated modeling, Scaled Satorra-Bentler chi-square (S-B χ^2) was evaluated and used as one of the indices instead of normal chi-square testing as suggested by Bentler and Bonett (P.M. Bentler, 2006) (Kline, 2005). In addition, the relationships (direct and indirect) between latent factors and variables were assessed for significance and possible indirect effects. The significance of mediation effect was assessed using Sobel test. Variances (R^2) were assessed for each outcome variable to determine the variance explained by the model.

Aim 2:

To examine whether AAPI mothers' and adolescents' perceptions of their interactions and the relationships to APMSE and to adolescents' sexual behaviors were similar for AA, whites, and Hispanic groups, three comparison models were examined to assess the significance and the strength of relationships in the model, using AAPI as the axial group. To begin the process of comparing these groups and evaluating the model fit, the constraints for both groups were initially set to be equal. Some path constraints gradually were released according to the theoretical framework and the Lagrange Multiplier test suggested by the EQS 6.1. The

constraint releasing procedure was to assess the paths that were significantly different between groups. The p value was assessed for its significance when a constraint was released. The model fit indices then were assessed for the fit between the data and the model. We hypothesized that adolescents' sexual initiation for each subgroup was influenced by their perceived maternal sexual expectations (APMSE). However, the strength of maternal influences for AAPI varied from other ethnic groups. For example, we hypothesized that as compared to AAs, whites, and Hispanics, AAPI adolescents were more influenced by indirect communications such as mothers' perceptions of connectedness, and adolescents' perceptions of connectedness and general communication than by direct maternal sexual communication. We also hypothesized that, compared to AAs, whites, and Hispanics, AAPI adolescents' age at first sexual initiation was more influenced by APMSE than by direct maternal sexual discussion. This hypothesis was based on the AAPI's cultural emphasis on family-centered and modest cultural values that might deter family members from talking directly about sex at home. However, adolescents' perceived maternal sexual expectations (APMSE) should remain effective for sexual initiation in all adolescents even though the formation of APMSE might be different from other cultural groups.

Aim 3:

To examine whether the relationships among mothers' and adolescents' perceptions of interactions, APMSE and adolescents' age at first sexual initiation varied according to adolescents' gender and level of acculturation, we hypothesized that the relationship between mothers' and adolescents' perceptions of interactions and

perceived maternal sexual expectations was stronger for AAPI adolescent females than for AAPI males, and the relationship between APMSE and the age of first sexual initiation was stronger for AAPI adolescent females than AAPI adolescent males. We also hypothesized that the more acculturated AAPI adolescents, the less likely they would be influenced by APMSE and consequently would have earlier onset of sexual initiation. To test the hypothesis regarding gender differences, we compared the divergences between AAPI males and females. To test the acculturation hypothesis, the levels of acculturation were assessed using the length of residence in the U.S. (treated as a continuous variable) and the language spoken at home. The acculturation variables were added as covariates into the final SEM testing to assess possible influences that might occur when adolescents' years of residence and language spoken at home were considered. See Figure 3 for the covariates structural equation model.

Limitations

Because of the nature of the secondary data analysis, one limitation is that there are limited items available to measure the study variables. The questionnaires were not originally developed to assess the variables in the theoretical framework for the proposed study. For example, to assess APMSE, adolescents' perceived maternal sexual attitudes were used as proxy for the expectations. Therefore, this variable may not reflect all aspects of maternal sexual expectations. It would be meaningful and important, in the future, to further test the concept of APMSE by using an established measure or by developing a psychometrically sound measure. In addition, the social economical status (SES) of mothers was not assessed in the analysis. It would be important to include this variable in the future investigation to understand potential

influences of family SES on mother-adolescent interactions with regards to adolescents' sexual behaviors.

Furthermore, due to the limitation of the subsample size of AAPI, it is not feasible at this time to analyze the subcultural differences within this AAPI sample. Hence, it is not possible to assess the uniqueness of each AAPI subcultural group's behavior. Another limitation of this study is that bicultural straddling is not measured directly or fully in this study. It would be important in the future to develop a measure to determine its influence on AAPI adolescents' health behaviors. However, this national representative longitudinal dataset has rich data that can be used in this study to generate understanding on this understudied population. This secondary analysis may be used to gain necessary understanding to build our knowledge regarding mothers' and adolescents' perceptions of their interactions and APMSE and to bridge gaps in the design of sexual health interventions and care for AAPI and other ethnic groups of adolescents.

Summary

The purpose of this research project was to examine maternal influences on adolescents' sexual initiation over time. The focus population of this research was on AAPI adolescents because the theoretical framework was derived from a qualitative study that was conducted with Taiwanese American mother and daughter dyads. The arrangement of this dissertation was in a three-paper format that would be covered comprehensively in the next three chapters. For example, the first manuscript, presented in Chapter II, focuses on the base AAPI model. This model testing is conducted to understand maternal influences on AAPI adolescents' sexual initiation

over time. One of the important factors that emerged from preliminary study was that Taiwanese American girls' sexual behaviors was related to how these adolescents perceived their mothers' sexual expectations, which depended on their relationship (and/or interactions) with their mothers. Hence, using a quantitative method to test the relationship between mother-adolescent interactions and adolescents' sexual initiation is an important way to gain knowledge about maternal influences on adolescents' sexual behaviors among this AAPI population.

The second manuscript, presented in Chapter III, explores possible racial and ethnic differences between AAPIs and other ethnic groups, namely African Americans, whites, and Hispanics. These comparison models were built upon the AAPI base model and were designed to understand the possible variations of maternal influences when taking account of adolescents' different cultural backgrounds at home. Additionally, in Chapter IV, the manuscript explores gender and acculturation influences among AAPIs on a gender comparison model and a covariate acculturation model. In this chapter, the acculturation factors are treated as covariates to examine their influences on the overall model. The outcome variables are adolescents' perceived maternal sexual expectations (APMSE) and their first sexual initiation over two time periods, Wave 1 (09/94–12/95) and Wave 2 (04/96–08/96). This evaluation was helpful in conceptualizing a design for intervention programs for AAPI adolescents and families.

In short, one needs to note that currently there is only limited research available that examines AAPI adolescents as a target research population in the area of sexual health. Members of this group are included in health research on sexual behaviors because of the requirement to include minority groups. Yet, being an AAPI adolescent,

living in an immigrant Asian home and existing within a Western dominant culture is a very different experience for AAPI adolescents from that of other ethnic and racial groups. The status quo of being a comparison group with other ethnic groups does not address or provide answers to their unique sexual health needs. The analysis of this large health data set has the potential to answer some of the research questions that are the keys to bridging gaps in disparities in sexual health care for AAPI adolescents and their families. Furthermore, when we use this model to compare the dynamic of AAPI adolescents' interactions with their mothers with those of African American, white, and Hispanic adolescents, we could provide a link to bridge the knowledge gaps between what we have known or not known about AAPI adolescents. Although we could not use this dataset to solve all the unknowns related to AAPI adolescents' bicultural straddling, with careful scrutiny of the interview questions, this data set could be used to shed new light on gaining the knowledge necessary to understand how sexual health messages are transferred from mothers to their adolescents in AAPI families and how this may be different from the experiences of other racial and ethnic families in the United States.

CHAPTER II

Maternal Influences on AAPI Adolescents' Perceived Maternal Sexual Expectation and their 1st Sexual Initiation

Abstract

The purpose of this study was to evaluate the fit of data to a longitudinal model examining how Asian American/Pacific Islanders (AAPI) mother-adolescent sex-related interactions (specifically, the mothers' perceptions of sexual discussion, connectedness, and adolescents' perceptions of general communication and connectedness with their others) affect adolescents' perceived maternal sexual expectations (APMSE) and their sexual initiation over time. The dependent variables were APMSE (a latent variable) and their sexual initiation over two time periods, Wave 1 (W1: 09/94–12/95) and Wave 2 (W2: 04/96–08/96). A national representative dataset, Add Health, was used for this secondary data analysis. The sample for the analyses consisted of 433 AAPI adolescents, ages 15–17 years and their mothers. Structural equation modeling (SEM) with EQS for Window 6.1 was used for the model testing procedure.

The longitudinal model showed a good fit for the sample as a whole, chi-square (34df, N = 433) = 351.99, $p = .992$; NFI = 1.000; NNFI = 1.10; CFI = 1.000; and RMSEA = .000 (90% CI = .0000 ~ .0000). The findings suggest that AAPI mothers' perceived sexual discussion was associated with earlier sexual initiation both at Wave 1 (direct effect) and Wave 2 (indirect effect); this variable also had a significant negative influence on APMSE at Wave 2, but not at Wave 1. Among four independent factors, maternal

perceived connectedness had a significant influence on AAPI adolescents' sexual initiation, directly at W1 and indirectly (via APMSE at W1) for W2. The most important finding was that, as proposed, APMSE (both Waves 1 and 2) emerged as the most essential protective factor for AAPI adolescents' sexual initiation. Maternal influences for AAPI adolescents and their implications for nursing practice, study limitations, and recommendations for future research are discussed.

Introduction

AAPI adolescents' sexual health-related problems often were overlooked because of their stereotype of being a trouble-free "model minority." Yet, AAPI women have incurred the highest increases in rates of certain sexually transmitted infections (STIs), such as gonorrhea and HIV/AIDS (Foo, 2002). For example, between 1999 and 2003, there was a 34% increase in AAPIs diagnosed with AIDS. From 1992 to 2004, there was a sevenfold increase in AAPIs diagnosed with AIDS (1,010 to 7,317) (CDC, 2004). For female adolescents and adults, heterosexual contact has been identified as the primary source of new cases of HIV/AIDS, yet there is a dearth of research literature examining sexual risk behaviors in this population. Thus, the purpose of this study was to examine how AAPI mother-adolescent interactions were related to adolescents' perceived maternal sexual expectations (APMSE) and adolescents' sexual initiation over two time periods. Mother-adolescents interactions (specifically maternal sexual discussion, adolescents' perceived general communication, and mother-adolescents perceived connectedness) have been suggested as factors that can protect against adolescent risky sexual behaviors (Clawson & Reese-Weber, 2003; Feldman & Rosenthal,

2002; Jaccard, Dodge, & Dittus, 2003; James, 2002). However, little is known about the influence of these variables on AAPI adolescents, for whom, sex is generally perceived as a “taboo” topic within the AAPI family dynamics (interactions between family members). Hence, in order to develop a nursing intervention program for this population, it is essential to gain an understanding of how such interactions between AAPI mothers and adolescents may influence the onset of sexual initiation among AAPI adolescents.

The specific aims of the study reported here were to explore the relationships among mothers’ and adolescents’ perceptions of these interactions (specifically those related to maternal perceived sexual discussion and connectedness, and adolescents’ perceived general communication and connectedness), adolescents’ perceived maternal sexual expectations (APMSE), and adolescents’ self-reported sexual initiation. The following hypotheses were posited:

H 1: Mothers’ level of interaction (as measured by level of sexual discussion and connectedness) is positively associated with adolescents’ perception of maternal sexual expectation (APMSE) and delayed sexual initiation over two time periods.

- **H1.1:** Maternal perceived sexual discussion is positively associated with the level of APMSE and later onset of sexual initiation at Waves 1 and 2.
- **H1.2:** Maternal perceived connectedness is positively associated with the level of APMSE and later onset of sexual initiation at Waves 1 and 2.

H 2: Adolescents’ level of interaction (as measured by adolescents’ perceived general communication and connectedness) is positively associated with the level of APMSE and delayed sexual initiation.

- **H2.1:** Adolescents' level of perceptions of general communication with their mother is positively associated with a higher level of APMSE and later onset of sexual initiation at Waves 1 and 2.
- **H2.2:** Adolescents' level of perceived connectedness with their mother is positively associated with the level of APMSE and later onset of sexual initiation at Waves 1 and 2.

H 3: Adolescents' perceived maternal sexual expectations (APMSE) at Waves 1 and 2 are negatively associated with adolescents' sexual initiation and mediates the relationship between mother-adolescents' interaction and sexual initiation.

- **H3.1:** APMSE at Wave 1 mediates the relationship between mother-adolescents' interaction and sexual initiation at Wave 2.
- **H3.2:** APMSE at Wave 2 mediate the relationship between mother-adolescents' interaction and sexual initiation at Wave 2.

A base AAPI model (Figure 4) was constructed to summarize the hypothesized relationships between independent and dependent variables.

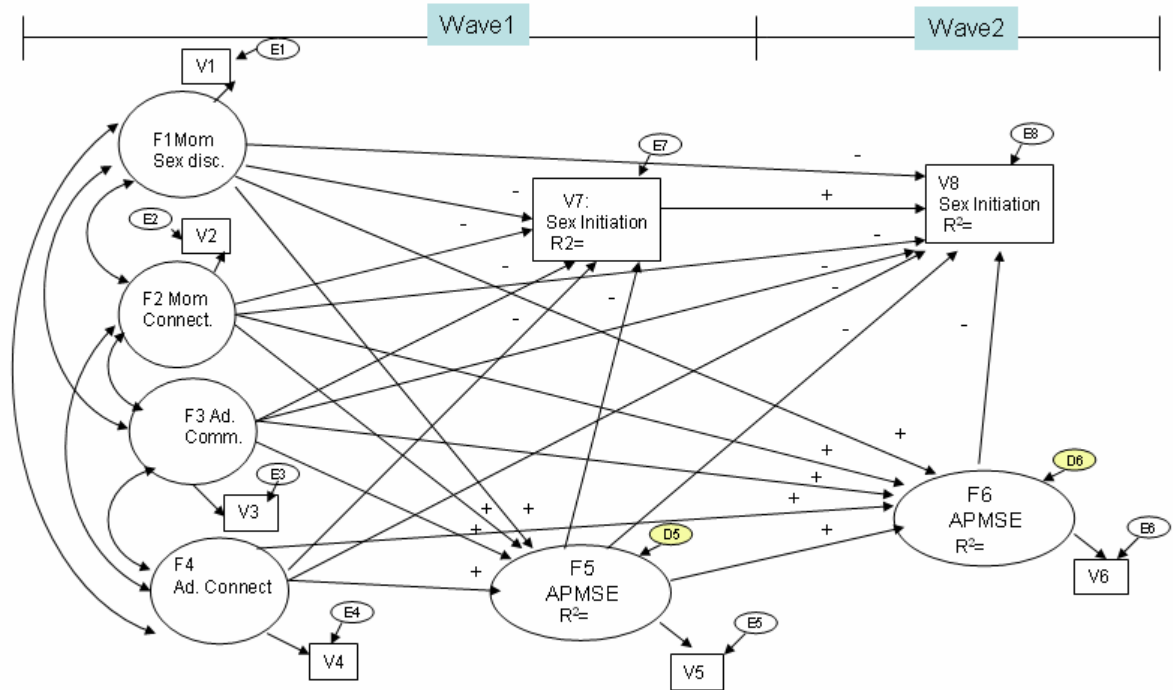


Figure 4: The Hypothesized AAPI Base Model

Background and Significance

Although many attempts have made to investigate factors associated with adolescent sexual behaviors, the majority of research has focused on intrapersonal factors, such as adolescents' self efficacy and their intention to engage in risky sexual behaviors (Faryna & Morales, 2000; Fisher, Fisher, Williams, & Malloy, 1994; Kinsman, Romer, Furstenberg, & Schwarz, 1999; Sieverding, Adler, Witt, & Ellen, 2005). Fewer studies have focused on interpersonal influences, particularly those of mothers and their adolescents. Maternal sexual discussion has been suggested to serve as a stepping-stone toward sexual health for adolescents (Clawson & Reese-Weber, 2003; Feldman & Rosenthal, 2002; Jaccard, Dittus, & Gordon, 1998, , 2000; Jaccard, Dodge, & Dittus, 2003; Jaccard, Dodge, Dittus, Feldman, & Rosenthal, 2002; Kirby, Miller, Feldman, & Rosenthal, 2002). Because

AAPI adolescents are socialized to view sex as a “taboo” topic within the family dynamic, this raises the following questions: 1) Do maternal sexual discussions occur in AAPI families? and 2) Do such discussions serve as a protective factor against risky sexual behaviors in AAPI adolescents?

A 1997 survey of 734 Asian American/Pacific Islander women conducted by the National Asian Women's Health Organization (NAWHO, 1997) found that one-third of these women never discussed pregnancy, sexually transmitted infections, birth control, or sexuality in their households. More than half of the women were uncomfortable discussing reproductive health with their mothers and were even more uncomfortable discussing these concerns with their fathers and brothers. Although these study results cannot be generalized to AAPI adolescents, the results do provide further support for a prospective examination of whether or not maternal sexual discussion is a protective factor for AAPI adolescents. Such an examination is essential because one of the negative health consequences found to be related to either poor or no maternal sexual discussion is adolescent engagement in compromising health behaviors, such as early initiation of intercourse or lack of condom use (Danziger, 1995; Jaccard, Dittus, & Gordon, 1996; Luster & Small, 1994; Upchurch, Aneshensel, Sucoff, & Levy-Storms, 1999). The family taboo surrounding sex, coupled with the lack of understanding about mother-adolescent sexual discussion, may account for the increase in sexually transmitted infections among Asian women and potentially AAPI adolescents.

Despite the rise in STIs in AAPI women (Foo, 2002), they are least likely of all populations to believe they are at risk for STIs and HIV, and also are the least likely to

receive sexual health care (Census, 2000; Foo, 2002; NAWHO, 1997). Although the number of reported AIDS cases among AAPIs is relatively small, they are just as susceptible to HIV/AIDS as other ethnic groups. For example, for AAPI female adults and adolescents, heterosexual contact was identified as the primary source of infection in 47% of cumulative AIDS cases compared to 37% of African American female adults/adolescents (APIAHF, 2007). Most importantly, an alarming number of HIV-positive AAPI women could not identify the specific risk factor for HIV/AIDS (SIECUS, 1999). Among cumulative reported HIV cases, “risk not reported or identified” accounted for 46% of the cases reported by AAPI adult/adolescent females compared to 39% for African Americans, 37% for Hispanics, 27% for whites, and 24% for Native Americans (APIAHF, 2007).

The fallacy of viewing the AAPI population as a well-off “model minority” has led the public to believe this population has few health-related problems. In reality, this is a heterogeneous group whose health needs are as genuine as those of other ethnic groups, along with additional pressure to overcome differences in appearance and culture. Hence, it is relevant to extend the breadth of knowledge of mother-adolescent interactions to include AAPI families. For instance, AAPI family-centered values were considered the strength of Asian culture in terms of preventing alcohol/drug abuse and/or promoting academic achievement (Hall & Barongan, 1997; Okazaki, 2002; Yeung & Chang, 2002). What is unclear is whether the AAPI family-centered values are protective against unplanned teenage pregnancies and STIs.

A 1992 survey of 2,026, 9th to 12th grade students (including 186 Asian American students) in Los Angeles county schools found that 26% of Asian American students who had engaged in vaginal intercourse during the preceding year reported they had never used condoms, compared to 14% of African Americans, 16% of whites, and 19% of “other” students (Schuster, Bell, Nakajima, & Kanouse, 1998). Although compared to other ethnic groups, AAPI adolescents have a lower incidence of STIs, once they became sexually active, AAPI adolescents were as likely as other ethnic groups to use drugs, alcohol, and/or to engage in unprotected sex (Grunbaum, Lowery, Kann, & Pateman, 2000). Hence, as a first step toward promoting sexual health among AAPI adolescents, a study examining the process of mother-adolescent interactions among AAPI families with specific attention to the onset of adolescents’ sexual initiation is essential. The main focus of the research reported here was to use structural equation model (SEM) to understand maternal influences that might be the result of adolescents’ daily interactions with their mothers.

Mother-adolescent perceptions of interaction

There are several important variables that may be significant in how mothers and adolescents interact on sex-related issues. For example, mothers’ perceptions of sexual discussions, adolescents’ perceptions of general communication, and both mother’s and adolescent’s perceptions of connectedness are important formative factors. From the literature review support for the relationship between maternal sexual discussions and adolescent sexual behavior is mixed. However, in the more recent studies, more frequent and positive maternal sexual discussions have been

associated with fewer sexual partners and later initiation and less frequent sexual activity (DiIorio et al., 2001; Jaccard, Dittus, & Gordon, 2000; Jaccard, Dodge, & Dittus, 2003; Jaccard, Dodge, Dittus, Feldman, & Rosenthal, 2002; Miller, 2002; Whitaker & Miller, 2000). For example, Whitaker and Miller (2000) found that peer norms were more strongly associated with risky sexual behavior for those adolescents who had not discussed sex or condom use than those who had such discussions with their mothers. On the contrary, Widmer (1997) found negative association between maternal sexual discussions and adolescents' levels of sexual behaviors. One possible explanation of this negative correlation could be that the mothers might decide to talk with their children after learning about their sexual or impending sexual activities. Hence, the timing of sexual discussion could be influential in understanding the research findings (Widmer, 1997). Although there are still some disagreement in the literature about the effectiveness of maternal sexual discussions and the onset and frequency of adolescent sexual intercourse, most research demonstrates consistent and positive links between the maternal sexual discussion and condom use in sexually active adolescents. For African American and Hispanic adolescents, in depth and more frequent sexual discussions with their mothers were positively associated with condom use (Crosby et al., 2002; DiClemente et al., 2001). Researchers (Jackson, Bijstra, Oostra, & Bosma, 1998; Miller, Kotchick, Dorsey, Forehand, & Ham, 1998) have suggested that in order to facilitate sexual discussions between mothers and adolescents, measures of such interactions should cover not only what is discussed, but also how the information is conveyed.

Other factors associated with satisfaction with family, such as perceived connectedness between mothers and adolescents, are equally important as discussions. In fact, studies (Resnick et al., 1997; Rodgers, 1999; Taris & Semin, 1997) have found the perceived connectedness between the mother and adolescent can lead to a successful sexual discussion and further decrease adolescent pregnancy risk. One potentially influential component for assessing AAPI mothers and adolescents interaction is the mothers' beliefs about the importance of role modeling. A well-known part of Confucianism for Asian parenting is, "Teach your children by setting a good example." For many Asian mothers, the way to teach their children values and health practices is not necessarily through sexual discussion. AAPI mothers may prefer non-direct communication (e.g., maternal monitoring or general communication about adolescents' daily activities). Yet, AAPI adolescents also live in an environment outside their families that emphasizes direct verbal discussion. As a result, they may not perceive non-verbal messages as well as their mothers do. This potential mismatch in teaching and learning styles could impede how AAPI adolescents perceive their mothers' expectations, which may consequently influence their sexual behaviors. Hence, as the first step of the research program, it is critical to understand how AAPI adolescents perceive their mothers' sexual expectations and how these expectations may affect their sexual initiation over time.

Adolescents' perceived maternal sexual expectations (APMSE)

Although extensive research has been conducted (Crosby et al., 2001, , 2002; DiClemente et al., 2001; Taris & Semin, 1997) that examines the family

functional (e.g., child rearing style; maternal connectedness, relation, and monitoring; sexual discussion) and structural (e.g., SES, presence of mother, marital status, mother's education) variables that can influence mother-adolescent sexual discussions, there is a paucity of documented studies that examine the effects of adolescents' perceived maternal sexual expectations (APMSE). Oftentimes, adolescents' sexual behaviors were investigated from the standpoint of individualism, which assumed that adolescents were independent in their decision making process with regard to their sexual behavior. However, at the same time, researchers (Feldman & Rosenthal, 2002; Jaccard, Dittus, & Gordon, 1996; Loveland-Cherry, 1983; Miller, 2002) have also recognized the importance of family influences by introducing the perspective of collectivism. For example, maternal (or paternal) sexual attitudes and/or family religious affiliation often were included in the line of investigation for predicting adolescents' sexual behaviors (Bettinger et al., 2004; Miller et al., 1997; Swanson, 1989).

One representative longitudinal study (Taris & Semin, 1997) examined the relationship among family distal variables, including SES, age of mother and child, and presence of the father, family proximate variables (e.g., child rearing styles, sexual permissiveness), and the amount of intra-family conflict and adolescent sexual behavior in British mother-adolescent dyads ($N = 302$ in Time 1 and $N = 255$ in Time 2). The results did not support the notion of delayed sexual initiation of adolescents as a consequence of positive mother-child relationships (perceived connectedness). In contrast, the stronger the maternal desire to maintain a good relationship with their adolescent child, the more likely that their adolescent's

sexual initiation would occur at a younger age. These researchers suggested, however, that the mothers might not be clear about their maternal sexual expectations when communicating with their adolescents, which, in turn, may result in earlier intercourse for those adolescents.

However, in another study (Miller, Forehand, & Kotchick, 1999) with 907 Black and Hispanic families in three communities (Alabama, New York and Puerto Rico), the mother-adolescent relationship (as measured by general communication between mother and adolescent) was a good predictor of adolescents' lower level of sexual behaviors. In the same study, maternal monitoring and maternal sexual attitudes (as a proxy for expectations) emerged as significant predictors for adolescent sexual behavior, while the family structural variables (as measured by family income, parent education, and maternal marital status) failed to predict adolescent sexual behaviors. One of the important findings was that, in the Puerto Rican sample, maternal attitudes (expectations) were more strongly related to adolescent sexual activities than they were in the Alabama and New York samples, suggesting that other family factors, such as different cultural values, acculturation experiences, and language variations, may influence the sexual behaviors of Puerto Rican adolescents.

The lack of any documented study examining AAPI adolescents' perceptions of the maternal control process, such as maternal expectations, provides support to move beyond a Western cultural perspective to understanding maternal expectations from the perspective of Asian cultures. For instance, Shek and Chan (1999), who frame maternal expectation as part of the maternal control process,

suggested that traditional Chinese parents expect their children to have attributes such as good character, obedience, and other virtues, and to not dishonor the family name. The expectations of respect for parents, honoring the family name, and preserving harmony are heavily emphasized in many Asian cultures. Hence, AAPI mothers may have different ways of expressing their expectations of their adolescents, such as through monitoring or in other daily activities. For example, Asian mothers might prefer to talk about adolescents' school, grade, friends, and/or party that they have engaged outside their home than talking about STIs, pregnancy or condom use. Furthermore, mismatched expectations between AAPI mothers and their adolescents may create conflicts or tensions in their relationship. Hence, when assessing AAPI mother-adolescent sexual expectations and their influences on adolescents' sexual activities, variables that determine mother-adolescents' interactions are important.

Summary

A gap noted from the literature review is a limited understanding of those factors that may influence AAPI adolescents' sexual health behaviors and the mechanisms by which they do so. Generally speaking, most sexual behaviors in adolescents have been studied from an individual perspective (i.e., focusing primarily on one's self-efficacy); more recent family studies have investigated adolescent sexual behaviors from the viewpoint of promoting family sexual discussions. Very few studies have incorporated family-centered cultural values when examining adolescents' sexual behaviors from the perspective of how adolescents perceive their mothers' sexual expectations. Because of the emphasis

on family-centered and modest cultural values in AAPI families, AAPI adolescents often have to face bicultural straddling on a daily basis. As a result, living within two cultures in one society might profoundly affect their growth and development (Willgerodt, Miller, & McElmurry, 2002). Hence, this research examined AAPI maternal influences not only from the perspective of the interactions between mothers and adolescents, but also from how AAPI adolescents perceived maternal sexual expectations. This approach seeks to understand the relationships among variables that explicate AAPI mother-adolescent interactions, adolescents' perceived maternal sexual expectations (APMSE), and their sexual behavior (particularly their first sexual initiation). In order to expand the growing body of health research on AAPI adolescents, studies of bicultural straddling and its influences on mother-adolescent interactions are required so that interventional models can be developed that reflect the unique needs of this population.

Methods

Prior to conducting the data analysis, approval for exemption from IRB review (HUM00011883) was obtained through the University of Michigan Health Science Institutional Review Board on March 21, 2007. The restricted-use Add Health data set was used to obtain the sample for analysis (Udry, 1998).

Design

A longitudinal design was used to examine the relationships among mother-adolescent interactions, adolescent perceived maternal sexual expectations (APMSE), and adolescents' sexual initiation. This was a secondary analysis of the

national representative longitudinal Add Health dataset (Udry, 1998) across two waves of data. The Social Ecological Model was used as the underlying theoretical framework (please see chapter I) to examine how AAPI adolescents' sexual behaviors were related to intra- and interpersonal influences. Structural Equation Modeling (SEM), specifically EQS 6.1 for MS Windows, was used to examine whether the data fit the longitudinal model, which was built upon a preliminary qualitative study (Kao, 2007).

Due to the limited sample size of AAPI, only relevant elements from micro- and meso-systems were included to reflect interactions between mother and adolescents. For example, variables from the micro-system (i.e., adolescents' perceived maternal sexual expectations) and the meso-system (i.e., mothers' and adolescent's perceptions of interactions) were examined for their influences on adolescents' sexual initiation. The relationships between independent variables and dependent variables are examined in two time periods, Wave 1 (09/94–12/95) and Wave 2 (04/96–08/96). Data in the Wave 3 (08/01–04/02) were not included in the analysis because many selected variables were not assessed in the Wave 3 interview.

Add Health Data Set

Data from the National Longitudinal Study of Adolescent Health (Add Health) were analyzed to examine the research hypotheses. The Add Health study began with an in-school questionnaire that was administered to a nationally representative sample of students in grades 7 through 12. The study continued with a series of in-home interviews of students at approximately one, two, and six years

later; Wave 1 (09/94–12/95), Wave 2 (04/96–08/96), Wave 3 (08/01–04/02).

Written informed consent was obtained from the parent or legal guardian and the adolescents prior to the Wave 1 interview. For 85.6% of the adolescents who participated, a resident parent (preferably the mother) completed a 30-minute in-home interview. The in-home interview for adolescents lasted about 90 minutes, on average. The response rate for the Wave 2 survey was about 88%. The data used for this secondary analysis were limited to the Wave 1 and Wave 2 in-home interviews. In-school questionnaires and Wave 3 in-home interview were not included in the analyses.

Analytic Sample

A series of inclusion and exclusion criteria were established to select the AAPI sample for this analysis. The inclusion criteria included adolescents 1) who identified themselves as being AAPI, 2) who had completed both the Wave 1 and Wave 2 in-home interview survey, 3) whose ages were between 15 and 17 years at Wave 1, and 4) whose mother had participated in the Wave 1 in-home interview. Adolescents who were younger than 15 years of age at Wave 1 were excluded because many sex-related questions only were asked of adolescents older than age 15. Adolescents who were older than age 17 at Wave 1 also were excluded because those participants who had finished high school were not included in the Wave 2 interview. Additional exclusion criteria were those adolescents 1) whose mothers did not participate in the Wave 1 in-home interview, 2) whose report on sexual initiation were inconsistent (e.g., reporting having sex prior to their birth date), and 3) who reported that their sexual initiation was on or before age 10. These exclusion

criteria were set to eliminate cases with potentially confounding factors. For example, those adolescents who reported that their sexual intercourse had occurred at or prior to age 10 had likely been through non-consensual sex; hence, we excluded such adolescents to avoid biased results. In addition, since the purpose of this study was to understand maternal influences, adolescents whose fathers or grandparents had participated in the in-home interview at Wave 1 also were excluded. The final AAPI sample consisted of adolescents (N = 433) aged 15 to 17 years (M = 16.06, SD = .773) and their mothers. The subgroups of AAPI adolescents (Table 4) included Filipino (52.4%), Chinese (24%), Japanese (7.2%), Korean (4.4%), Asian Indian (2.3%), Vietnamese (2.3%), and other Asian (15.5%). The total percentage for the subgroups was greater than 100% because some adolescents identified themselves as being a member of more than one Asian group. Missing data (about 10%) were handled by the built-in algorithm (Pair) of EQS 6.1 for Windows.

Table 4: Frequency Distribution of AAPI Demographic Data

Ethnic subgroups *	Ages			Gender		subtotal	
	15 yrs	16 yrs	17 yrs	Male	Female	N	percentage
Chinese	42	38	24	54	50	104	24.0%
Filipino	47	97	83	115	112	227	52.4%
Japanese	10	13	8	16	15	31	7.2%
Asian Indian	2	5	3	4	6	10	2.3%
Korean	10	7	2	7	12	19	4.4%
Vietnamese	2	2	6	4	6	10	2.3%
Other Asian	20	23	24	36	31	67	15.5%
*Subtotal	116	173	144	223	210	433	
Percentage	26.7%	40.0%	33.3%	51.5%	48.5%		

*Note some adolescents self-identified as belonging to more than one Asian subgroup

Measures

Four latent factors were constructed to measure mother and adolescent interaction with regard to sexual health education at home, including maternal sexual discussion and perceived connectedness and adolescents' perceived general communication and connectedness. Two dependent variables were measured over two time points using one latent construct (APMSE) and one observed variable (sexual initiation). Table 5 provides the descriptive statistics for the observed variables, internal reliabilities (Cronbach's alpha), and the confirmatory factor analysis (CFA) in the measurement model.

Dependent variables

Adolescents' perceived maternal sexual expectation (APMSE)

A latent factor composed of three items (constructed as one indicator using the standardized mean) was selected to assess adolescents' perceived maternal sexual expectations. The three items were: 1) How would your mom feel about you having sex at this time in your life? 2) How would your mom feel about you having sexual intercourse with someone who is special to you and you know well—like a steady girlfriend/boyfriend? (scored as 1 = “strongly disapprove” to 5 = “strongly approve”); and 3) If you had sexual intercourse, would it upset your mom? This was scored as 1 = “Strongly agree” to 5 = “strongly disagree.” Items were reversed coded to indicate the higher score for the higher perceived maternal sexual expectation ($\alpha = .790$ at Wave 1; $\alpha = .799$ at Wave 2). The factor loadings were .89, .83, and .59, respectively, for Wave 1 and .90, .75, and .66, respectively, for Wave 2.

Age of Sexual Initiation

To reflect the onset of sexual initiation, an observed variable was formed by combining several questions to calculate the age of the first sexual exposure. The questions included the following: Have you ever been sexually active? In what month [and year] did you have sexual intercourse for the very first time? In what month [and year] were you born? At Wave 1, a 1–7 scale was constructed to reflect their first sexual exposure (1 = no sex exposure; 2 = at age 17; 3 = at age 16; 4 = at age 15; 5 = at age 14; 6 = at age 13; 7 = at age 11 or 12). At Wave 2, a 1–8 scale was constructed to reflect the onset of sexual initiation (1 = no sex exposure; 2 = at age 18; 3 = at age 17; 4 = at age 16; 5 = at age 15; 6 = at age 14; 7 = at age 13; 8 = at age 11 or 12).

Independent Variables

There were four independent variables (latent factors) in our model to assess mother-adolescent interactions.

Maternal perceived sexual discussion

This latent factor was constructed from four items (combined into one indicator using the standardized mean), which was used to assess mothers' perceptions of sexual discussion ($\alpha = .825$). For example, the extent of discussion was assessed by questions such as, How much have you and your child talked about him/her having sexual intercourse and the negative things that would happen if (he got someone/she got) pregnant? The dangers of getting sexually transmitted diseases? How much have you talked to your child about sex? The response was a Likert-type scale that ranging from 1 = Not at all to 4 = A great deal.

Table 5: Descriptive Statistics of Observed Variables and Measurement Model

	Descriptive			Measurement model		
	N	Mean	SD	Factor Loading	SE	Error
F1: Maternal sexual discussion ($\alpha=.825$)	422	2.50	1.12	.883	1	.469*
V1: Extent of discussion: negative things						
V2: Extent of discussion: STIs	423	2.82	1.14	.851	.032 [†]	.525*
V3: Degrees of discussion: about sex	422	2.41	1.06	.776	.031 [†]	.631*
V4: Sex discussion: difficult to explain	415	3.66	1.11	.452	.047 [†]	.892*
F2: Maternal perceived Connectedness ($\alpha=.626$)	431	4.40	.70	.621	1	.784*
V5: Getting along well						
V6: Making decisions together	430	3.97	.99	.625	.127 [†]	.781*
V7: Can really trust adolescents	430	4.39	.87	.579	.117 [†]	.815*
F3: Adolescents' perceived general communication ($\alpha=.588$)						
V8: Talking about party you attended	415	.31	.46	.476	1	.879*
V9: Talking about personal problem	415	.29	.45	.485	.157 [†]	.874*
V10: Talking about school work or grade	415	.66	.48	.553	.168 [†]	.833*
V11: Talking about other things you do in school	415	.57	.50	.540	.166 [†]	.842*
F4: Adolescents' perceived connectedness ($\alpha=.851$)						
V12: How close do you feel to your mother	415	4.35	.89	.675	1	.737*
V13: Your mom is warming and loving toward you	415	4.27	.81	.712	.056 [†]	.702*
V14: Satisfied w/ the way of communication	415	3.86	1.06	.806	.056 [†]	.591*
V15: Satisfied w/ relationship	415	4.20	.90	.898	.063 [†]	.440*
F5: APMSE at Wave 1 ($\alpha=.790$)						
V16: Your mom's feeling about having sex at this time of your	415	4.52	.75	.884	1	.467*
V17: Your mom's feeling about having sex w/ someone special	415	4.18	.95	.829	.045 [†]	.559*
V18: Would your mom upset if you had sexual intercourse	411	4.29	1.04	.594	.044 [†]	.804*
F6: APMSE at Wave 2 ($\alpha=.799$)						
V19: Your mom's feeling about having sex at this time of your life.	401	4.34	.85	.896	1	.444*
V20: Your mom's feeling about having sex w/ someone special	400	4.06	1.02	.749	.044 [†]	.663*
V21: Would your mom upset if you had sexual intercourse	399	4.20	.996	.660	.044 [†]	.751*
V22: Sexual initiation at W1 (1-7 scale)	433	1.88	1.64			
V23: Sexual initiation at W2 (1-8 scale)	433	2.16	1.89			

Fit indices for measurement model: $S-BX^2 = 300.29$ ($df=179$, $N=433$) $p=.000$; $NFI=.931$; $NNFI=.966$; $CFI=.971$; $RMSEA=.040$ (90% $CI=.032-.047$);

* $p < .05$; ** $p < .01$; [†] $p < .001$

The mothers' comfort with having sexual discussions was assessed by a question such as, Would it be difficult for you to explain things if you talked with your child about sex and birth control (responses could range from 1 = Strongly agree to 5 = Strongly disagree. The factor loadings were .88, .85, .77, and .45, respectively.

Mothers' perceived connectedness

A latent factor represented by three items (constructed as one indicator using the standardized mean) was selected to assess mothers' perceptions of connectedness with their adolescents ($\alpha = .626$). Because of the low reliability, when error terms were calculated, the alpha was specified at .80. This assumption is a more conservative way (as compared to using .626) to account for possible error when variance is considered. The three items were the following: 1) Do you get along with him/her well? 2) Do you and he/she make decisions about his/her life together? 3) Do you feel you can really trust him/her? A five point Likert scale was used with responses of 1 = always, 2 = often, 3 = sometimes, 4 = seldom; 5 = never. The coding was reversed to reflect higher scores for greater connectedness. The factor loadings were .62, .63, and .58, respectively.

Adolescents' perceived general communication

A latent factor represented by four categorical items (1 = Yes; 0 = No) (combined as one indicator using the standardized mean) was selected to assess adolescents' perceived general communication with their mothers in the past four weeks. The four items were: Have you done the following activities with your Mom in the past 4 weeks—1) talked about a party you went to; 2) talked about a personal problem; 3) talked about school work (or grade); or 4) talked about other

things you are doing in school. The factor loadings were .48, .49, .56, and .54, respectively. This latent factor had low internal reliability ($\alpha = .588$), which probably was due to the time frame (in the past four weeks) set by the question that could limit its reliability. For example, the adolescents might not have spoken with their mothers about a party because they had not attended a party during that time frame. Hence, this latent factor probably is closer to a formative factor. Thus, when calculating the error terms, the alpha was conservatively set at .80.

Adolescent's perceived connectedness

A latent factor presented by four items (combined as one indicator using the standardized mean) was selected to assess adolescents' perceived connectedness with their mothers ($\alpha = .851$). The questions were the following: 1) How close do you feel to your mother? (Likert scale with responses ranging from 1 = Not at all to 5 = A great deal); 2) Most of the time, is your mother warm and loving toward you? 3) Are you satisfied with the way you and your mother communicate with each other? 4) Overall, are you satisfied with your relationship with your mother? The responses for items 2–4 were on a 5-point Likert scale ranging from 1 to 5 (1 = Strongly agree to 5 = Strongly disagree). Items 2–4 were reverse coded to reflect high scores for higher levels of connectedness. The factor loadings of the four items were .68, .71, .81, and .90, respectively.

Data Analysis

Interval- and categorical-level data with normal distribution patterns based on score ranges, means, standard deviation, skewness and kurtosis, and scatterplots were

assessed with parametric statistics. The multivariate Kurtosis was assessed using Mardia normalized estimates (17.28) for the appropriateness of a normal distribution. Although Mardia normalized estimates was not greater than problematic 30, due to the inclusion of four categorical variables in the model testing, robust statistic was used for estimation (Muthén & Kaplan, 1985; Newsom, 2005). SPSS 14 for Windows was used to transfer data from the subset data constructed by SAS 9.1. Psychometric tests were performed to assess the reliability and validity of each measure. Internal consistency reliability was assessed using the Cronbach's alpha coefficient. Construct validity was assessed using exploratory and confirmatory factor analysis procedures (Table 5). Table 6 presents the means and standard deviations for the composite scales used in the model. Table 7 presented the inter-correlations among the composite variables. EQS 6.1 for Windows (Bentler, 2006) was used for structural equation modeling. The fit of the structural model was assessed using robust estimation on the covariance model.

Table 6: Descriptive Statistics of Composite Variables

	Mean	SD	N
F1: Maternal sexual discussion	-.0046	.814	426
F2: Maternal perceived connectedness	.0002	.764	433
F3: Adolescent general communication	-.0119	.668	415
F4: Adolescent Perceived connectedness	-.0107	.836	415
F5: APMSE at Wave 1	-.0334	.871	415
F6: APMSE at Wave 2	-.0302	.852	401
DV7: Sex initiation at Wave 1 (1–7 scale)	1.8776	1.644	433
DV8: Sex initiation at Wave 2 (1–8 scale)	2.1570	1.888	433

Table 7: Correlations among Composite Scales

	F1	F2	F3	F4	F5	F6	DV7	DV8
F1	1							
F2	-.022	1						
F3	.236**	.114*	1					
F4	-.044	.238**	.331**	1				
F5	.034	.161**	-.029	.009	1			
F6	-.048	.188**	.015	.050	.606**	1		
DV7	.139**	-.221**	.133**	-.046	-.275**	-.304**	1	
DV8	.177**	-.196**	.109*	-.084	-.140**	-.249**	.728**	1

** Correlation is significant at the 0.01 level (2 tailed).

* Correlation is significant at the 0.05 level (2 tailed).

In our model, there were four dependent variables—adolescents’ perceived maternal sexual expectations (APMSE) at Wave 1 and Wave 2, and adolescents’ onset of sexual initiation at Wave 1 and Wave 2. The skewness of sexual initiation was 1.7498 and 1.4413, respectively. Although the skewness was not greater than the problematic values of 2 (West, Finch, & Curran, 1995), the skewness was assessed and found to be caused by a large proportion of adolescents (73.4% at Wave 1 and 67.4% at Wave 2) indicating they were not sexually active. In this case, a score of “1” was assigned to indicate no sexual exposure. For those adolescents who reported being sexually active, their age of sexual initiation was calculated according to their birthday and entered into the 1–7 scale (Wave 1) and 1–8 scale (Wave 2), the higher the number, the earlier the sexual initiation. Both scales were treated as continuous variables during the analysis because they had seven and eight scales in the measure.

The model was tested using confirmatory latent structural equation analysis with the EQS 6.1 Windows program. The main reason for choosing the structural equation model (SEM) was its capability to test the theoretical model simultaneously with all the constructs (McDonald, 2002). That is, several

exogenous and endogenous variables could be assessed at the same time. Another important consideration for using SEM was the recognition that observed variables were measured with error, that is, their reliabilities were known to be less than perfect. Hence, the error terms were taken into account for the estimation. We performed these analyses on the total sample of 433 AAPI adolescents and their mothers. All of the analyses were performed using non-weighted data for the following reasons. First, although there is a consensus for using weighted data in generalizing descriptive statistics for targeted subpopulations, there is no agreement in multivariate analyses (Gelman, 2006). Since we only used a small portion (3%) of the Add Health sample ($N = 13,568$ at Wave 2) in the analysis, adjusting the weight for over-sampled AAPI (or the non-responsive rate) would not necessary produce unbiased inferences. Second, many of the attributes (e.g., ethnicity, school cohort, or regional cohort) were based on controls for unequal selection probabilities. When sampling weights were only used for a function of independent variables included in the model, using non-weighted data is probably better because the non-weighted estimates are unbiased, consistent and have much smaller standard errors than weighted estimates (Winship & Radbill, 1994). Third, we performed analyses using both weighted and non-weighted data and the results of analyses were very similar between the non-weighted and weighted estimates (using normalized weight procedure in EQS 6.1); hence, the non-weighted estimates were used in the model testing. Cases with missing data (10%) were handled with built-in Pair algorithm of EQS 6.1. The reason the Pair algorithm was selected, instead of maximal likelihood algorithm, is that the Pair algorithm allows the concurrent use of

robust procedure which could account non-normal distribution of data. As a result, all 433 cases were included in the model testing.

Because the data's distribution was within normal distribution, maximal likelihood estimated chi-square (X^2) was used as one of indices. In general, a non-significant chi-square will indicate the model fit. However, since X^2 is sensitive to the sample size, other indices were used to assess the model fit. Following the recommendation of Raykov, Tomer, and Nesselroade (1991) we reported goodness-of-fit measures: normed fit index (NFI), nonnormed fit index (NNFI), and comparative fit index (CFI). We also reported one misfit index, root mean square error of approximation (RMSEA). Fit indices the exceeded .90 and the RMSEA misfit that was below .06 are considered to indicate acceptable fit (Bentler, 2006; Raykov, Tomer, & Nesselroade, 1991).

The number of iterations for convergence and largest standardized residuals were assessed. The level of significance ($p < .05$) of factor loading for each item, variances of independent factors, error terms, and covariance between each factor were reviewed. The path coefficients were reported in the standardized solution (Figure 5). The Wald test for dropping parameters and the Lagrange Multiplier test for adding parameters were considered. The best-fit measurement model was used as a foundation for testing the structural model. Path loadings, error terms, and the amount of variance explained (R^2) for the dependent variables were reported in the standardized solution.

Results

Measurement model

The measurement (confirmatory) model was assessed with the longitudinal model using six latent factors (21 variables). The dependent variables (DV7 and DV8) were not included in the measurement model. The measurement model converged in 94 iterations and the factor loading for each item (range from .45 to .90) is shown in Table 5. The largest standardized residual was less than 0.18. Since S-B χ^2 is sensitive to the sample size, we also used other indices to assess model fit. The fit and misfit indices showed that the hypothesized measurement model was statistically acceptable. The fit and misfit indices were: $\chi^2 = 331.678$ $N = 433$, $df = 179$, $p = .000$; NFI = .931; NNFI = .966; CFI = .971; RMSEA = .040. These fit indices were above the recommended .90, and the misfit indices were below the recommended .06, which meant that the longitudinal data fit the measurement model fairly well and we could proceed to structural (path) model testing.

Structural model

In testing the structural (path) model, we not only added the pathways among the factors in the longitudinal data, but also added the two observed variables as endogenous variables in the analysis. These two endogenous variables were the age of adolescents' first sexual initiation at Wave 1 and Wave 2. They were treated as continuous variables because they were 7 and 8-point variables. The direct, indirect, and total effects of the structural model were assessed and evaluated; these

are listed in Table 8. In addition, mediation effect of APMES was assessed. The fit and misfit indices for this full longitudinal model were: $X^2 = 351.99$ ($N = 433$, $df = 34$, $p = .992$), $NFI = 1.00$, $NNFI = 1.10$, $CFI = 1.000$, $RMSEA = .000$ (Figure 5).

Although results supported some of our hypotheses, several hypotheses were not supported. For example, hypothesis 1.1 (the positive influences of maternal sexual discussion) was not supported. On the contrary, maternal sexual discussion not only failed to predict later sexual initiation for AAPI adolescents, but also had a negative association with AAPI adolescents' sexual initiation, both at Wave 1 (direct effect) and at Wave 2 (indirect). Moreover, maternal sexual discussion also was negatively related to APMSE at Wave 2, but not at Wave 1. This finding suggests that, for AAPI adolescents, their mothers' perceptions of a higher level of sexual discussion did not result in a higher level of perceived maternal sexual expectations for the adolescents. This could possibly be the result of mismatched perceptions or of a miscommunication between mothers and adolescents about maternal sexual expectations. Similarly, Hypothesis 2.1 (the positive influences of adolescents' perceived general communication with their mothers) was not supported. Unlike the common belief, the adolescents' perceived general communication also was associated with earlier sexual initiation at Wave 1 and Wave 2 through both direct and indirect effects. These negative associations could be the result of unclear or belated communication. For example, mothers might talk about sex only after they had sensed their adolescents' impending sexual debut.

When assessing the effects of connectedness (Hypothesis 1.2 and 2.2), we found that the results varied between the mothers and adolescents. For instance, while there

were no statistically significant direct, indirect, or total effect of adolescents' perceived connectedness (H2.2) on any of the four dependent variables, maternal perceived connectedness (H1.2) emerged as the most important effective predictor for all four dependent variables through direct, indirect, and total effects. That is, the mothers' perceptions of connectedness were associated with a higher level of APMSE at Wave 1 (direct effect) and at Wave 2 (indirect effect), and with delayed sexual initiation at Wave 1 (direct effect) and Wave 2 (indirect effect).

Regarding Hypothesis 3, we found important support for the effects of APMSE. In fact, APMSE (at both Wave 1 and Wave 2) emerged as the most consistent protective factor for AAPI adolescents' sexual initiation over these two time periods. Most importantly, APMSE at Wave 1 predicted later sexual debut for AAPI adolescents at Wave 2. The results also suggested a mediation effect of APMSE between mothers' perceived connectedness and adolescents' sexual initiation at Wave 2. The Sobel test was calculated and indicating a significant mediation effect (test statistic= 2.65; $p=.023$) of APMSE. That is, although we have not found direct effect of mothers' perceived connectedness on adolescents' sexual initiation at Wave 2, we found its influences through mediation of APMSE. In other words, adolescents whose mothers reported a higher level of connectedness, also perceived a higher level of maternal sexual expectation (APMSE) and were consequently had delayed onset of their sexual initiation over time. This finding is congruent with the results of a qualitative study (Kao, 2007) that found that AAPI adolescents' sexual behaviors were influenced by how they perceived their mothers' sexual expectations if the expectations were viewed by the adolescents as being reasonable.

Figure 5 provided the results (presented in standardized path coefficients) of this path model. Unlike what we had hypothesized, the formation of APMSE was not significantly associated with all forms of mother-adolescent interactions. Instead, the only significant predictor of APMSE was mothers' perceived connectedness. The mothers' sexual discussion, on the other hand, had negative association with the formation of APMSE at Wave 2.

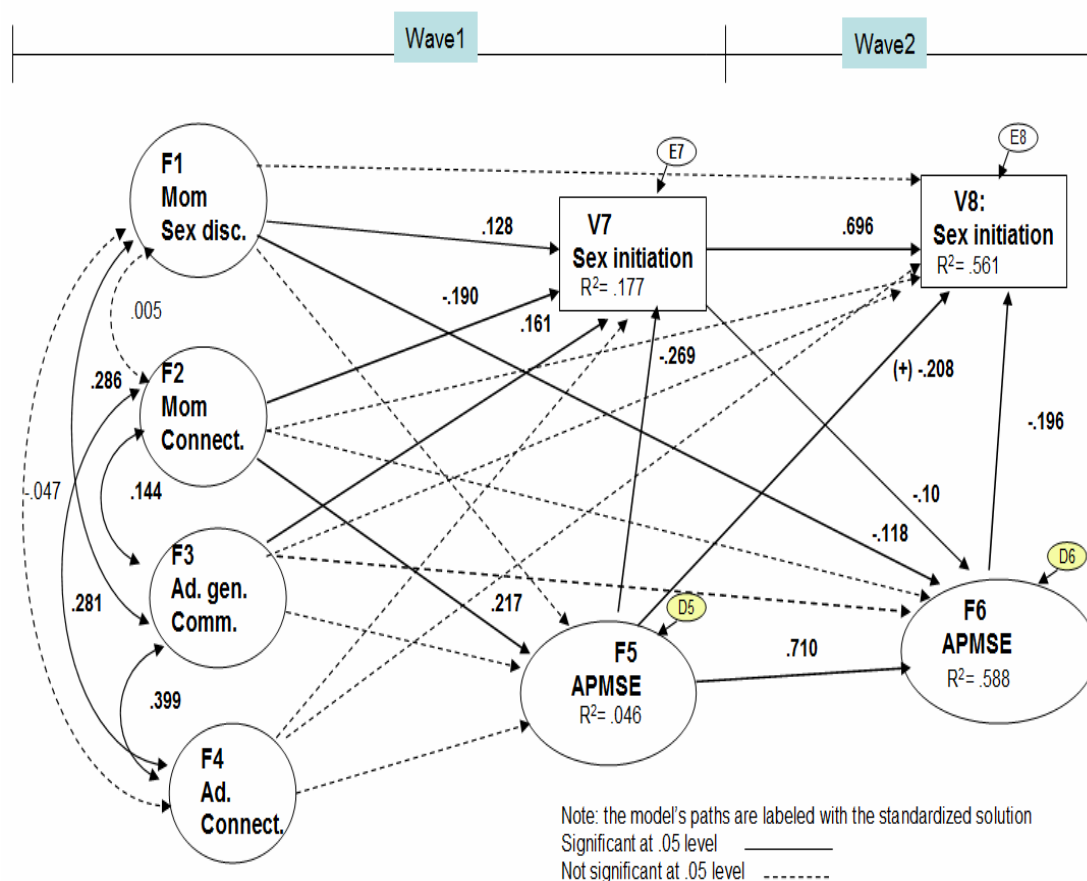


Figure 5: Results of AAPI Longitudinal Path Model

Fit indices: $\chi^2 = 351.99$ (df=34, N=433) $p = .992$, NFI=1.000; NNFI=1.100; CFI=1.000; RMSEA=.000 (90%CI is .000-.000)

Discussion

The purpose of this study was to examine the relationships among AAPI mothers' perceptions of sexual discussion and connectedness; adolescents' perceptions of general

communication and connectedness; adolescents' perceived maternal sexual expectation (APMSE), and adolescents' sexual initiation over two time points. The best-fitting plausible model indicated that adolescents' sexual initiation at Wave 1 and Wave 2 of the Add Health study were influenced directly by APMSE at both waves. The study findings suggested that the best way to delay sexual initiation by AAPI adolescents is by promoting adolescents' perceived maternal sexual expectations. However, the findings of this study did not support the notion that maternal sexual discussion could delay AAPI adolescents' sexual initiation. Instead, this study revealed that AAPI maternal sexual discussion was correlated with earlier sexual initiation for AAPI adolescents and was also associated with lower level of APMSE. In fact, among the four independent factors, the maternal perceived connectedness emerged as the most important protective predictor for delaying adolescents' sexual initiation at both Wave 1 and at Wave 2.

Unlike the previous hypothesis, AAPI maternal sexual discussion was not found to be protective in terms of delaying AAPI adolescents' sexual initiation. On the contrary, maternal sexual discussion was associated with early sexual initiation at Wave 1 (direct effect) and at Wave 2 (indirect effect), which could be a result of unclear or mismatched communication about maternal sexual expectations. One implication derived from this analysis is that maternal sexual discussion among AAPI families might not be as effective as in families of other racial and ethnic groups. This could be the result of unclear communication about maternal sexual expectation, possibly due to language or cultural barriers between the generations. Hence, when promoting sexual

health education at home, the clear and effective communication about maternal sexual expectations is important.

Table 8: Direct, Indirect, and Total Effects of the Structural Model

Variables	Effect	F5	F6	DV7	DV8
F1: Maternal sexual discussion	Direct		-.118*	.128*	-----
	Indirect		-----	-----	.110*
	Total		-----	.117*	.159*
F2: Maternal perceived connectedness	Direct	.217*	-----	-.190*	-----
	Indirect	-----	.179*	-.059*	-.174*
	Total	-----	.238*	-.248*	-.229*
F3: Adolescent general communication	Direct			.161*	-----
	Indirect			-----	.109*
	Total			.178*	.145*
F4: Adolescent Perceived connectedness	Direct				
	Indirect				
	Total				
F5: APMSE at Wave 1	Direct		.710*	-.269*	(+) -.208*
	Indirect		.027*	-----	-.332*
	Total		.750*	-.269*	-.540* 11
F6: APMSE at Wave 2	Direct				-.196*
	Indirect				-----
	Total				-.196*
DV7: Sexual initiation at Wave 1	Direct		-.100*		.696*
	Indirect				-----
	Total				.715*
DV8: Sexual initiation at Wave 2	NA				

*p < .05;

(+) original sign;

11 the total effect was calculated after the sign changed for the direct effect

The other important finding is the mediating effect of APMSE between maternal perceived connectedness and AAPI adolescents' sexual initiation at Wave 2. Unlike our common belief, this finding suggested that APMSE was not formed by maternal sexual discussion, but by maternal perceived connectedness. In other words, those adolescents whose mothers felt closer to their adolescents also reported higher levels of APMSE, which has been shown to be protective for delaying adolescents' sexual debut. Hence,

AAPI family intervention programs should not be limited to promoting maternal sexual discussion or APMSE; the intervention programs should also aim to establish a trusting relationship between mother and adolescents and consequently increasing mothers' perceived connectedness with their adolescents.

Limitations

Although the final structural model was plausible based on evaluation of the fit and misfit indices, several limitations are worth mentioning. First, maternal monitoring was shown to be an important predictor of adolescents' sexual behavior in many studies (Crosby et al., 2001; Hartos & Power, 2000; Hayman, 2002; Li, Fang, Stanton, Su, & Wu, 2003; Sieverding, Adler, Witt, & Ellen, 2005). However, because of the nature of this secondary data analysis, this factor was not included in the model testing because of the lack of validated items in the Add Health dataset reflecting maternal monitoring. Second, reliabilities of two latent factors (maternal perceived connectedness and adolescents' perceived general communication) were lower than the recommended .70 (.626 and .588, respectively). Although conservative measures were taken to calculate for the error terms, it is important to note that these two factors were more formative in nature than the reflective factors. Third, APMSE is a latent factor created to reflect adolescents' perceived maternal sexual expectation (and attitude). This construct is a rather new concept that requires further testing for its validity. In the future, it would be helpful and important to develop a psychometrically sound measurement to verify its usefulness for predicting adolescents' sexual behavior. And fourth, APMSE has been verified as an important predictor for AAPI adolescents' sexual initiation in this study.

It would be helpful to see whether this latent factor has a similar effect in adolescents from other ethnic groups.

Implications

The result suggested several important findings. First, APMSE emerges as the most consistent protective factor for AAPI adolescents' sexual initiation. Second, maternal sexual discussion did not protect against AAPI adolescents' sexual initiation or promote the formation of APMSE. Third, for the adolescents to successfully perceive their mothers' sexual expectations, the mothers' perceived connectedness is fundamental.

Several implications can be derived from this study. First, to delay AAPI adolescents' sexual initiation, nursing interventions should aim to increase adolescent's perceived maternal sexual expectation. Second, nurses should encourage AAPI mothers to establish a trusting relationship with their adolescents since this is the key for their adolescents to have higher level of perceived maternal sexual expectation (APMSE). Third, future study should investigate factors associate with how adolescents perceive their mothers' (as well as their fathers') sexual expectations and their effects on the sexual behaviors, including condom use. Fourth, to more fully understand maternal influences, future nursing research should include maternal monitoring as one of predictors. Fifth, future research should include cross-cultural evaluation. For example, a comparison model testing with other ethnic groups can help us understand cross-cultural differences in maternal influences on adolescents' sexual behaviors.

In summary, although some of the hypotheses were not supported, the overall result reinforced the findings of the preliminary qualitative study (Kao, 2007). AAPI

adolescents' sexual behaviors were influenced by how the adolescents perceived their mothers' sexual expectations. The acceptance of this AAPI model indicates that addressing maternal influences within the family dynamics could be a way to promote AAPI adolescents' sexual health. It also provides evidence to move beyond individual-focused research to consider maternal influences in a collective context.

CHAPTER III

Maternal Influences and Adolescents' Sexual initiation: AAPI and Other Racial/Ethnic Groups

Abstract

The purpose of this study was to compare the effects of maternal influences on adolescents' sexual initiation among four racial/ethnic groups. Using a sample generated from the Add Health data set (see Chapter I), three comparison models were constructed and tested to examine differences between Asian American Pacific Islanders (AAPI) and three other racial and ethnic groups—African Americans (AA), Hispanic Americans (HA), and whites. The AAPI base model (see Chapter II) was used as an a priori model for comparison using Structural Equation Modeling (SEM) (EQS 6.1 for Windows) (Bentler, 2006).

The fit indices of the comparison models showed that the model fit the data fairly well. Overall, adolescents' sexual initiation was associated with mother-adolescent interactions (i.e., sexual discussion, general communication, and perceived connectedness) and adolescents' perceived maternal sexual expectations (APMSE). However, some variations were noted when comparing the AAPI group with the other racial/ ethnic groups. For example, AAPI adolescents' perceived maternal sexual expectation (APMSE) at Wave 1 was a strong predictor of AAPI adolescents' sexual initiation at Wave 2; however, this predictive value was not significant for the other

groups. It should be noted that across all the groups, APMSE was consistently associated with adolescents' later sexual initiation using cross sectional data within the same waves. The findings support the notion that for adolescents, different cultural values (e.g., individualism and collectivism) at home may have different effects on the relationship between APMSE and adolescents' sexual initiation. The cross-cultural differences of maternal influences, limitations of the study, and implications for future research and nursing practice are discussed.

Introduction

As demonstrated in previous chapters, adolescents' perceived maternal sexual expectations (APMSE) were found to be protective for Asian-American/Pacific Islander (AAPI) adolescents' sexual initiation over time. The purpose of this study was to further examine cross-cultural differences in these relationships between AAPI adolescents and other racial/ethnic groups in the United States (U.S.). The racial/ethnic diversity of the U.S. population is an important variation that may influence adolescents' sexual behavior. The diversity in adolescents' home cultural values could play an important role in how mothers and adolescents interact with each other and how adolescents perceive their mothers' sexual expectations, particularly since some racial/ethnic groups may place more emphasis on collective cultural values than the majority, white population. Hence, by comparing AAPI with other racial/ethnic groups, the possible differences among racial/ethnic groups in the U.S. could be explicated. Furthermore, this evaluation is important since intervention programs that are not successful could be the result of a failure to consider such cross-cultural variations.

Therefore, this study assessed cross-cultural differences using multiple-group invariance analyses. Structural Equation Modeling (SEM) has become the method of choice for assessing cross-cultural differences among groups by testing measurement of invariance across groups (Liang, 2001). Using one of the structural equation modeling programs, such as AMOS, EQS, or LISREL, an a priori factor model can be specified and tested for various degrees of invariance. This study used SEM (EQS 6.1 for Windows) to assess cross-cultural differences in maternal influences on adolescents' sexual initiation among four racial/ethnic groups (AAPI, African American, Hispanic American, and Caucasian/White). The authors hypothesized that sexual initiation in adolescents is influenced by their interactions with their mothers; however, the paths of the maternal influences may vary between AAPI adolescents and those of other racial/ethnic groups. This study explored these potential differences. The AAPI group was used as the reference group for comparisons because this population group is the least studied and has distinct cultural values that are different from the majority and other cultures. Although the majority of cross-cultural studies have focused on the cultural differences between people in various countries (Farruggia, Chen, Greenberger, & Dmitrieva, 2004; Park & Huebner, 2005; Stein, Lee, & Jones, 2006), this study focused on cross-cultural differences within the United States. This approach is beneficial for understanding cultural variations in maternal influences when the context of cultural norms in the majority is approximately comparable.

Background and Significance

Historically, because of Western cultural influences, research on adolescent sexual health has used an individualistic perspective (Ajzen & Madden, 1986; Fishbein,

Middlestadt, & Hitchcock, 1991). Some researchers who have used a family system perspective have balanced the interest of individuals with the collective well-being of the family (Aronowitz, Rennells, & Todd, 2005; Kirby, Miller, Feldman, & Rosenthal, 2002; Lederman, Chan, & Roberts-Gray, 2004; Watts & Nagy, 2000). While the constructs of individualism-collectivism have been criticized as conceptually “fuzzy” and a “catchall” to represent all possible forms of cultural differences (Brewer & Chen, 2007), one cannot deny the existence of cultural variations in health behaviors, particularly when comparing the sexual health behaviors of European Americans with those of East Asians (Chan, 1994; Strunin, 1994). For example, although there is no evidence that supports that European Americans are less collectivist than East Asians (e.g., Japanese and Koreans), European Americans generally have been found to score higher on measures of individualism (Oyserman, Coon, & Kemmelmeier, 2002). Hence, a study to compare cultural variations is an essential step in understanding the role of cultural values in adolescents’ homes.

Currently, increased attention has focused on examining how family members act to promote adolescents’ capabilities in order to decrease high-risk sexual behaviors. For example, mother-adolescent and father-adolescent communication about sex has been consistently shown to influence adolescents’ sexual behaviors, particularly in regard to condom use and delay of sexual debut (Clawson & Reese-Weber, 2003; Feldman & Rosenthal, 2002; McDowell, Parke, & Wang, 2003; Shearer, Crouter, & McHale, 2005). To fully understand maternal influences on adolescents’ sexual initiation, adolescents’ cultural values at home need to be considered. In the current study, AAPI is used as the reference group because AAPI adolescents are the least

studied population in the areas of sexual health or maternal influences. Currently, the majority of studies in diverse populations related to adolescent sexual health have been conducted with African American and Hispanic American adolescents (Pantin, Prado, Schwartz, & Sullivan, 2005; Pantin, Schwartz, Sullivan, Prado, & Szapocznik, 2004; Shearer, Crouter, & McHale, 2005). Little attention, if any, has been paid to AAPI adolescents. Although some findings (Pantin, Schwartz, Sullivan, Prado, & Szapocznik, 2004; Shearer, Crouter, & McHale, 2005) from studies with other minority groups have been used to understand AAPI adolescent behavior, the differences in Asians' social and cultural backgrounds and their different mechanisms of adaptation limit the generalizability of studies in other populations and may mask the unique needs and problems of AAPI adolescents related to sexual health. Therefore, to further understand maternal influences within a cultural context, it is important to compare AAPI mother-adolescent interactions with regard to sexual initiation with that of other previously studied racial/ethnic groups.

Mother-adolescent Interactions

Maternal Sexual Discussion

Several forms of interactions between mothers and adolescents have been linked to adolescent sexual behaviors. For example, maternal sexual discussion, maternal support (warmth; perceived connectedness), and maternal control (regulation; monitoring) have been associated with later sexual debut (Danziger, 1995; Upchurch, Aneshensel, Sucoff, & Levy-Storms, 1999), lower frequency of intercourse (Jaccard, Dittus, & Gordon, 1996), higher likelihood of contraception use (Jaccard, Dittus, &

Gordon, 1996; Luster & Small, 1994), and lower frequency of teenage pregnancy (Barnett, Rapini, & Gbur, 1991). In addition, adolescents' perceived maternal attitude and connectedness have been found to be good predictors of adolescents' delayed sexual debut, less frequent sexual activity, and safer sexual behavior (i.e., condom use) (Markham et al., 2003; Resnick et al., 1997).

Perceived Communication

Differences have been found between reports by mothers and adolescents on the amount of sexual discussion. Generally speaking, mothers tended to overestimate the amount of sexual discussion, while adolescents were more likely to underestimate such discussions (Jaccard, Dittus, & Gordon, 1998). With regard to sexual initiation, the effects of perceived sexual communication were mixed. Although most research has linked maternal sexual discussion with adolescents' later and less frequent sexual intercourse, some research has found that maternal sexual discussion was associated with earlier sexual initiation (Widmer, 1997). Some researchers have suggested that other factors, such as the mother/adolescent relationship and how the information was conveyed, also were influential (Clawson & Reese-Weber, 2003; Feldman & Rosenthal, 2002; Kirkman, Rosenthal, & Feldman, 2002; Miller, Kotchick, Dorsey, Forehand, & Ham, 1998; Shearer, Crouter, & McHale, 2005). Although the results are mixed in terms of linking the relationship between maternal sexual discussion and later sexual initiation, maternal sexual discussion consistently has been shown to have protective effects with regard to adolescent condom use, particularly among African and Hispanic Americans (Jaccard & Dittus, 2000; Whitaker & Miller, 2000).

With regard to which parent engages in sexual discussions with their adolescent, mothers have been identified as the primary parent who communicates about sexual topics with their adolescents in AA, HA, and white families (Miller, Kotchick, Dorsey, Forehand, & Ham, 1998). Besides this similarity among these racial/ethnic groups, some differences were found concerning parent-adolescent sexual discussions. For example, Swain and colleagues (2006) found that low-income and minority parents reported having more discussions with their adolescents about the negative consequences of sex and on where to obtain birth control than higher income, white parents. In addition to sexual discussion, mother-adolescent general communication also has been associated with less risky sexual behaviors for AA and HA adolescents (Miller, Forehand, & Kotchick, 1999). Additionally, the mother/adolescent relationship has been identified as an important predictor of adolescent sexual behavior (Benda & DiBlasio, 1994; Christopher, Johnson, & Roosa, 1993; Jenson, De-Gaston, & Weed, 1994; Rodgers, 1999; Taris & Semin, 1997).

Perceived connectedness

Some studies have linked parental support/connectedness with adolescent pregnancy risk. Although the findings (Benda & DiBlasio, 1994; Resnick et al., 1997; Rodgers, 1999; Taris & Semin, 1997; Whitbeck, Hoyt, Miller, & Kao, 1992) have been mixed, for the most part parental support/connectedness has been suggested to be protective against early sexual initiation (Danziger, 1995; L. B. Whitbeck, Conger, & Kao, 1993; L. B. Whitbeck, Hoyt, Miller, & Kao, 1992), sexual risk taking (i.e., multiple sex partners and not using condoms), and the daughter's getting pregnant (Resnick et al., 1997). However, some research has identified contrary findings about

the effects of parental influences (Benda & DiBlasio, 1994; Christopher, Johnson, & Roosa, 1993; Jenson, De-Gaston, & Weed, 1994; Rodgers, 1999; Taris & Semin, 1997). For example, findings from a longitudinal study by Taris and Semin (1997) indicated that quality of the parent-child relationship was associated with earlier sexual initiation. They argued, however, that the stronger the parent's desire to maintain a good relationship with their adolescent, the more likely the adolescent would experience sexual initiation at a younger age. Hence, to better understand the effects of parent-child relationship and its possible influences on sexual initiation across the current study's two waves of data, it is important to investigate mother/adolescent perceived connectedness both separately and simultaneously as exogenous latent factors in a structural model along with other factors (i.e., mothers' perceptions of sexual discussion and adolescent's perceived general communication).

In terms of maternal influences, mother-adolescent connectedness (supportive relationship) also has been associated with adolescents' sexual attitudes, later sexual initiation (Chewning & Koningsveld, 1998; Miller et al., 1997), and consistent contraception use among sexually active teens (Miller et al., 1997). However, there is evidence that the levels of closeness between mother and adolescent had little or no effect on adolescents' sexual behaviors (Jaccard, Dittus, & Gordon, 1996; Jaccard, Dittus, & Gordon, 1998). It is possible that the effects of parenting are largely indirect and are moderated through their influences on adolescents' development of sexual attitudes and expectations (Kao, 2007), which also might be tied closely to their cultural values at home. Hence, it is important to understand whether there are racial/ethnic differences in the formation of adolescents' perceived maternal sexual expectation

(APMSE) and its influences on sexual initiation across racial/ethnic groups and over time.

Cultural variations

Although many attempts have been made to investigate factors associated with adolescents' sexual behaviors, the majority of the research has focused on intrapersonal factors, such as adolescents' self-efficacy and their intention to engage in certain risky behaviors (Faryna & Morales, 2000; Fisher, Fisher, Williams, & Malloy, 1994; Sieverding, Adler, Witt, & Ellen, 2005). Few studies have focused on interpersonal influences, particularly those between AAPI mothers and adolescents. Family cultural values often play an important role in adolescent behavioral development (Irvine, 1994). For example, adolescents raised in the context of a collective-focused culture might be influenced more by family and interpersonal factors than those adolescents who were raised in the context of an individual-focused culture. Understanding variations in these cultural influences on adolescent sexual behavior could be a vital step for developing a culturally responsive intervention program that seeks to delay early sexual initiation.

In summary, although multiple efforts have been made to determine maternal influences on adolescent sexual development and behavior, it is not clear which specific components of maternal influences exert an influence on adolescent sexual initiation and whether these influences remain similar across all racial/ethnic groups. In this study, AAPI is used as the reference group because 1) there is limited understanding about maternal influences on AAPI adolescent sexual behavior, and 2) the cultural

values of AAPIs tend to be collective and interpersonal-focused, which is different from the majority culture in the United States, which emphasizes individual and intrapersonal-focused cultural values. Hence, an investigation using AAPI as the reference group could yield new knowledge on maternal influences through a different perspective.

Research Question

AAPI adolescents' sexual health is understudied because of the small size of the AAPI population and the stereotype that the AAPI group is a "model" minority. Consequently, previous research studies have aggregated AAPIs with other minority groups where they were only a small portion of the sample. However, with its small weight, the results were rarely representative and thus could not reflect the unique cultural influences of AAPIs. Hence, the purpose of this study was to understand maternal influences in AAPI adolescent sexual initiation within a cultural context. The research question of this study is whether there are any cultural differences in maternal influences when comparing AAPI adolescents with other racial/ethnic groups. By understanding the similarities and differences in the cultures of AAPIs and other racial/ethnic groups, we would have a better basis for knowing whether tailoring to the specific values of different groups of adolescents, such as AAPIs, may increase their effectiveness.

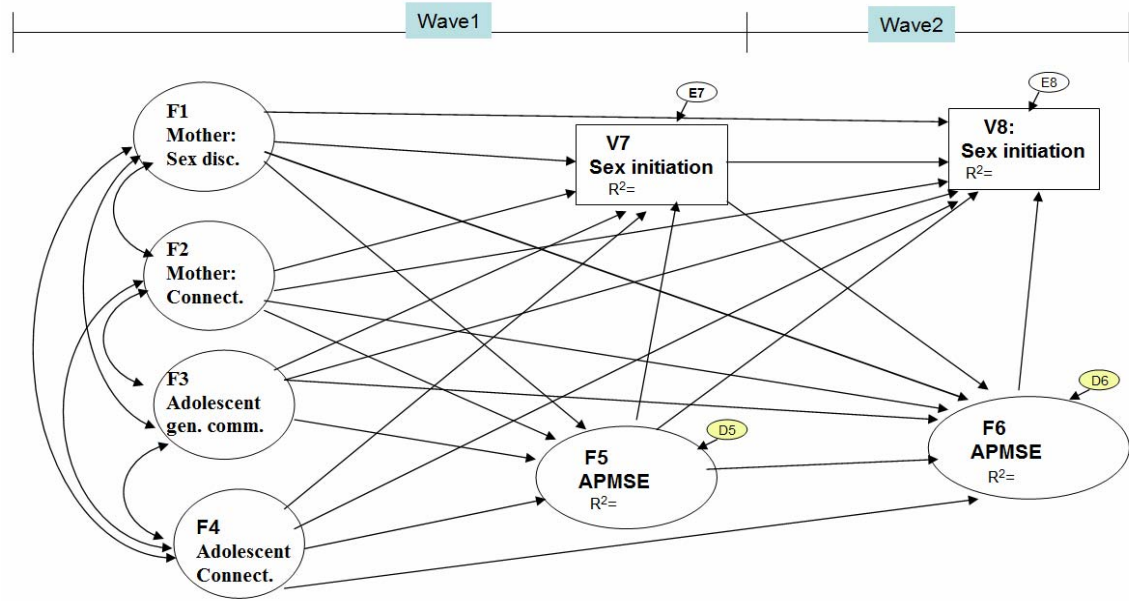


Figure 6: A Priori Model

Methods

Approval for exemption from IRB review (HUM00011883) was obtained from the University of Michigan Health Science Institutional Review Board on March 21, 2007. The restricted use Add Health data set was used to obtain the sample for the analysis (Udry, 1998).

Design

This study was a secondary analysis of the national representative longitudinal Add Health dataset (Udry, 1998) across two waves of data. The AAPI base model (see Chapter II) was used as an a priori structural model for testing invariance between AAPI adolescents and other racial/ethnic groups. Structural Equation Modeling (SEM), specifically EQS 6.1 for Windows (Bentler, 2006), was used to examine various degrees of invariance between AAPI and other racial/ethnic adolescents. A measurement model, confirmatory factor analysis (CFA), was performed separately

with each group to assess differences in factor loadings for each latent factor, followed by three comparison structural models to evaluate the variances between groups. Four latent factors (F1–F4) were used as exogenous factors, including mothers’ perceptions of sexual discussion, mothers’ perceptions of connectedness with their adolescents, adolescents’ perceptions of general communication, and adolescents’ perceptions of connectedness. Two latent factors (F5–F6)—adolescents’ perceived maternal sexual expectation (APMSE) at Wave 1 and Wave 2—were used as endogenous factors. In addition, two dependent variables—adolescents’ sexual initiation at Wave 1 and Wave 2—were included as endogenous variables. The reliabilities (Cronbach’s alpha) of the latent factors were assessed and compared between groups (see Table 9). Detailed descriptions of the measures used in this analysis were provided in Chapter II.

The built-in algorithm (Pair) was the primarily technique used to handle missing data. The Pair procedure was chosen over Maximal Likelihood or Listwise deletion because of its compatibility with the robust statistics (ML, Robust) and its capability to use all available cases including cases with missing data. “That is, ML estimators based on the pairwise covariances are obtained, and the resulting statistics are subsequently corrected in the conceptual way described by Satorra and Bentler (1994) using the van Praag et al. theory” (Bentler, 2006, p. 6). Robust statistics were preferred because the data of whites and HAs were departing from multivariate normality. Hence, for the purpose of consistency, all model testing was conducted using the pairwise algorithm along with robust statistics (ML, Robust). Listwise deletion was not used because it can render a longitudinal study with few cases left, resulting in grossly ineffective estimates

(Brown, 1994). This was especially important in this study, since the reference population (AAPIs) was the smallest group of subjects.

Five steps of structural equation modeling were used to guide the model testing; these were the validation of the measurement model, model specification, parameter estimation, testing fit and model modification. To evaluate the fit of data to the measurement and structural model, several fit and misfit indices were used, including the Bentler-Bonnett Normed Fit Index (NFI), Bentler-Bonnett Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), and Root Mean-Square Error of Approximation (RMSEA).

Table 9: Cronbach's Alpha of Latent Factors of Each Group

Latent Factors	ITEMS	Cronbach's Alpha			
		AAPI	AA	HA	White
F1 Mother: sexual discussion	V1: Extent of mother's sexual discussion	$\alpha=.831$	$\alpha=.807$	$\alpha=.805$	$\alpha=.815$
	V2: Extent of discussion (STI)				
	V3: Degree of discussion: sex				
	V4: Sexual discussion (difficult to explain)				
F2 Mother: connectedness	V5: Mother: getting along well	$\alpha=.609$	$\alpha=.659$	$\alpha=.643$	$\alpha=.675$
	V6: Mother: made decision together				
	V7: Mother: connectedness: trust				
F3 Adolescent: communication	V8: Adolescent: talked about party	$\alpha=.589$	$\alpha=.580$	$\alpha=.585$	$\alpha=.552$
	V9: Adolescent: talked about personal problem				
	V10: Adolescent: talked about school work				
	V11: Adolescent: talked about things in school				
F4 Adolescent: connectedness	V12: Adolescent felt close towards mother	$\alpha=.852$	$\alpha=.849$	$\alpha=.841$	$\alpha=.853$
	V13: Adolescent: felt mother is warm and caring				
	V14: Adolescent: communicated with mother				
	V15: Adolescent: good relationship with mother				
F5 APMSE at Wave 1	V16: Mother's feeling about having sex at this time of your life	$\alpha=.791$	$\alpha=.810$	$\alpha=.821$	$\alpha=.832$
	V17: Mother's feeling about having sex with a steady friend				
	V18: Having sex would upset your mother				
F6 APMSE at Wave 2	V19: Mother's feeling about having sex at this time of your life	$\alpha=.797$	$\alpha=.817$	$\alpha=.818$	$\alpha=.856$
	V20: Mother's feeling about having sex with a steady friend				
	V21: Having sex would upset your mother				

To compare the differences between groups, equality of constraints was initially applied to the nested model, which assumed that all covariances of the exogenous variables and all directional paths were the same between groups. The constraints were released one at a time to achieve the final plausible comparison model. The LaGrange Multiplier test (LM test) was used to assess which constraint would be released, particularly when the Chi-square dropped significantly ($p < .05$).

Sample Selection

The inclusion and exclusion criteria were set to select those adolescents 1) whose ages at the Wave 1 interview were between 15 and 17 years; 2) who had completed both the Wave 1 and Wave 2 in-home interviews; 3) whose mothers (or mother figure) had participated in the Wave 1 in-home interview; 4) who did not have an inconsistent report on the age of sexual initiation (e.g., having sex prior to their date of birth or who reported sexual initiation at a future time); and 5) whose reported date of sexual initiation was not on or before age 10. These criteria were set to eliminate confounding factors. For example, if sexual intercourse had occurred on or before age 10, it was likely to be nonconsensual sex; hence, including these in the analysis would lead to a biased result. The final sample selected for this study included 433 AAPI, 1,241 HA, 1,367 AA, and 4,597 white adolescents. Table 10 presents the description of the sample by gender and age. Although the proportions of gender and age of adolescents were comparable across the groups, the AA group had a higher percentage of females than males (60.2% females and 39.8% males).

Table 10: Distribution of Adolescents by Group, Gender, and Age

Group	N	Gender		Age		
		M	F	15	16	17
AAPI	433	223 (51.5%)	210 (48.5%)	116 (26.8%)	173 (40%)	144 (33.3%)
AA	1367	544 (39.8%)	823 (60.2%)	467 (34.2%)	519 (38%)	381 (27.9%)
HA	1241	601 (48.4%)	640 (51.6%)	397 (32%)	465 (37.5%)	379 (30.5%)
White	4597	2267 (49.3%)	2330 (50.7%)	1612 (35.1%)	1670 (36.3%)	1315 (28.6%)

Analysis

Measurement model

Prior to measurement model testing, several approaches were used to examine missing cases and data distribution. First, a separate frequency and descriptive analysis for each group was conducted to examine the pattern of missing data and found that approximately 10% of the cases in each group had missing data (AAPI 10%; HA 9.8%; AA 9%; White 8.8%). Second, the use of the Pair algorithm along with robust statistics (ML, Robust) was considered. The Pair algorithm's capacity to maximize available cases and to consistently adjust for data's departure from normal distribution was viewed as strengths. The Pair and robust procedure (ML, Robust) was selected because it allows for the use of maximum data.

The multivariate Kurtosis was assessed using Mardia normalized estimates for the appropriateness of a normal distribution in all groups the values were 17.28, 30.23, 46.59, and 80.1 (AAPI, AA, HA, and white, respectively). According to Newsom's suggestion (2005), a normalized Mardia greater than 30 indicates a problematic kurtosis. West, Finch and Curran (1995) also suggest concerns if skew > 2 and kurtosis > 7.

Table 11: Comparison of Factor for the Measurement Model: AAPI and Racial/Ethnic Groups

Groups\Factors		AAPI				AA				HA				White			
		N	M	Std	FL	N	M	Std	FL	N	M	Std	FL	N	M	Std	FL
F1: Maternal Sexual Discussion	V1	422	2.5	1.12	0.883	1351	3.24	0.94	0.837	1221	2.92	1.01	0.827	4561	2.94	0.94	0.85
	V2	423	2.82	1.14	0.851	1350	3.42	0.87	0.842	1222	3.1	0.98	0.853	4564	3.16	0.9	0.814
	V3	422	2.41	1.06	0.776	1346	3.31	0.88	0.803	1223	2.84	1	0.79	4545	2.99	0.87	0.818
	V4	415	3.66	1.11	0.452	1358	4.22	0.92	0.412	1226	3.88	1.13	0.436	4567	4.25	0.89	0.441
F2: Maternal Perceived Connectedness	V5	431	4.4	0.7	0.621	1366	4.27	0.77	0.696	1240	4.45	0.71	0.712	4597	4.24	0.66	0.718
	V6	430	3.97	0.99	0.625	1364	3.88	0.94	0.58	1239	3.98	0.99	0.61	4588	3.9	0.85	0.612
	V7	430	4.39	0.87	0.579	1361	4.24	0.91	0.626	1236	4.39	0.92	0.554	4584	4.33	0.84	0.614
F3: Adolescents' Perceived General Communication	V8	415	0.31	0.46	0.476	1312	0.49	0.5	0.367	1193	0.45	0.5	0.456	4388	0.53	0.5	0.292
	V9	415	0.29	0.45	0.485	1312	0.42	0.49	0.403	1193	0.37	0.48	0.499	4388	0.41	0.49	0.303
	V10	415	0.66	0.48	0.553	1312	0.67	0.47	0.619	1193	0.63	0.48	0.564	4388	0.66	0.47	0.666
	V11	415	0.57	0.5	0.54	1312	0.59	0.49	0.651	1193	0.54	0.5	0.524	4388	0.55	0.5	0.68
F4: Adolescents' Perceived Connectedness	V12	415	4.35	0.89	0.675	1312	4.54	0.82	0.622	1193	4.53	0.81	0.673	4387	4.48	0.8	0.664
	V13	415	4.27	0.81	0.712	1312	4.3	0.85	0.661	1191	4.28	0.81	0.663	4385	4.36	0.76	0.677
	V14	415	3.87	1.06	0.806	1312	4	1.08	0.879	1193	4	1.02	0.824	4385	3.97	1.01	0.838
	V15	415	4.2	0.9	0.898	1312	4.25	0.93	0.901	1192	4.26	0.89	0.866	4384	4.23	0.87	0.909
F5: APMSE at Wave 1	V16	415	4.52	0.75	0.884	1303	4.18	0.92	0.88	1181	4.21	0.93	0.85	4360	4.31	0.84	0.893
	V17	415	4.18	0.95	0.829	1301	3.8	1.1	0.813	1182	3.85	1.1	0.854	4360	3.94	1.03	0.836
	V18	411	4.29	1.04	0.594	1284	3.93	1.16	0.641	1171	3.97	1.16	0.651	4279	4.09	1.07	0.676
F6: APMSE at Wave 2	V19	401	4.34	0.85	0.896	1269	4	0.96	0.866	1144	4.06	0.926	0.875	4281	4.09	0.91	0.897
	V20	400	4.06	1.02	0.749	1269	3.67	1.12	0.799	1140	3.72	1.07	0.818	4278	3.77	1.05	0.85
	V21	399	4.2	0.99	0.66	1265	3.8	1.19	0.689	1138	3.79	1.2	0.677	4271	3.91	1.1	0.719
DV7*		433	1.88	1.64		1367	2.82	2.05		1241	2.26	1.81		4597	2.15	1.73	
DV8**		433	2.16	1.89		1367	3.38	2.31		1241	2.82	2.16		4597	2.74	2.08	

*sexual initiation at Wave 1; ** sexual initiation at Wave 1

Measures of skew and kurtosis indicated that the data were not normally distributed for a number of variables across all four groups, particularly for whites and HAs.

Additionally, with the inclusion of several categorical variables (Muthén & Kaplan, 1985), the robust statistic (ML, Robust) was selected as most appropriate, rather than the standard maximum likelihood procedure. Hence, scaled Storra-Bentler X^2 (S-B X^2) was selected as one of the fit indices. Table 11 presents the factor loadings for each variable of the measurement model for each group.

As previously noted, Figure 6 is the a priori structural model for the group comparisons to understand the cultural variations in maternal influences on adolescent sexual initiation. Before conducting the structural comparison models, a measurement model was tested separately for each racial/ethnic group to assess whether the assumed structure was a reasonable representation of the actual data set. In the measurement model, each item was treated as an indicator for the latent factors (with multiple indicators). Confirmatory factor analysis (CFA) was performed for each group. The factor loadings were assessed and compared among groups (see Table 11).

Overall, the factor loadings for each group were very similar, except for items 8 (<.4 for AA and white) and 9 (<.4 for white). The low factor loading might be the result of the timeframe posted within the question. For example, item 8 (V8) was, “In the past four weeks, did you (the adolescent) talk to your mother about a party you went to?” Item 9 (V9) assessed whether or not the adolescent had talked with their mother about a personal problem in the past four weeks. Because of the timeframe specified, these two items were likely to be situation-dependent. It is possible that AA and white adolescents did not feel the needs to talk to their mothers about their personal problem or a party they

have attended. Although the factor loading for AAs and whites was low for these two items, because the AA and white groups were used as the comparison groups, these two items were kept for the consistency in comparison.

Goodness-of-fit is an important concept in structural equation modeling to evaluate how well the theoretical model being tested actually matches the data. Goodness-of-fit for the models was assessed with the scaled Storra-Bentler X^2 (S-B X^2), Bentler-Bonnett Normed Fit Index (NFI), Bentler-Bonnett Non-Normed Fit Index (NNFI), Robust Comparative Fit Index (RCFI), and Root Mean-Square Error of Approximation (RMSEA). Although Chi-square (X^2) was not an ideal index to assess the model fit because of its sensitivity to the sample size, scaled Storra-Bentler chi square (S-B X^2) was used as one of the fit indices for its recommended use in evaluating the improvement of model fit when one of constraints was released. When analyzing indicators with non-normal distributions, the Storra-Bentler chi square (S-B X^2) procedure is most appropriate because it adjusts the value of X^2 downward from the standard Maximal Likelihood (ML) estimation by an amount that reflects the degree of observed kurtosis (Satorra & Bentler, 1994). When assessing for goodness of model fit, a nonsignificant S-B X^2 is desirable. In addition, the Yuan-Bentler Residual-based F-Statistic was used to assess the level of significance when one of the constraints was released. Table 12 provides the fit and misfit indices for the measurement models of each group. With the fit index (i.e., NFI, NNFI, and RCFI) above the recommended .90 and the misfit index (i.e., RMSEA) below the suggested .06 (Raykov, Tomer, & Nesserlroade, 1991), it was assumed that the measurement model for each group fit the data fairly well and the structural comparison models could be examined.

Table 12: Comparisons of Fit Indices for Measurement Model across Racial/Ethnic Groups

Group	Fit indices	Misfit indices	Missing data (MI)
AAPI	Scaled Storra-Bentler $\chi^2(179df, N=433)=300.29$, $p=.00$; NFI=.931; NNFI=.966; RCFI=.971 Yuan-Bentler Residual-based F-statistic(179, 254)=1.089, $p=.265$	RMSEA=.040 90% CI .032-.047	MI= Pair
AA	Scaled Storra-Bentler $\chi^2(179df, N=1367)=415.92$, $p=.00$; NFI=.968; NNFI=.978; RCFI=.981 Yuan-Bentler Residual-based F-statistic (179, 1188)=2.313, $p=.000$	RMSEA=.031 90% CI .027-.035	MI= Pair
HA	Scaled Storra-Bentler $\chi^2(179df, N=1241)=515.14$, $p=.00$; NFI=.957; NNFI=.966; RCFI=.971 Yuan-Bentler Residual-based F-statistic(179, 1062)=2.822, $p=.000$	RMSEA=.040 90% CI .036-.044	MI= Pair
White	Scaled Storra-Bentler $\chi^2(179df, N=4597)=1772.93$, $p=.00$; NFI=.949; NNFI=.946; RCFI=.954 Yuan-Bentler Residual-based F-statistic(179, 4400)=10.73, $p=.000$	RMSEA=.044 90% CI .042-.046	MI=Pair

NNFI = Bentler-Bonnett Normed Fit Index NNFI = Bentler-Bonnett Non-Normed Fit Index

RCFI = Robust Comparative Fit Index RMSEA = Root Mean-Square Error of Approximation

Structural Comparison Models

In the structural model testing, we used a composite single indicator for each of the latent factors (F1–F6). The reason for using a composite indicator, rather than multiple indicators, is its feasibility for incorporating specifications and empirical evaluations in a larger structural model in which the total number of parameters can be larger than those without composites. That is, using composites can substantially reduce parameters to be estimated (Liang, Lawrence, Bennett, & Whitelaw, 1990). For example, if multiple indicators were used for the comparison structural model, the total number of parameters to be estimated would be 74, which to have enough power would require a sample size of 370 to 740. Using composites as a single indicator for the latent factors, the free parameters are reduced to 36 in which the cases required to derive a reliable estimate would be reduced to 180 to 360 according to Bentler's suggestion (1985) that the ratio between sample size and the number of free parameters should be from 5 to 10,

depending on the distributional assumptions or being distribution-free. Since the sample size of the AAPI group was limited to only 433 cases, a decision was made to use composites for the latent factors to simplify the model testing.

Three structural comparison models were examined to assess the differences between AAPI adolescents and those of the other racial/ethnic groups. These models were AAPI-AA, AAPI-HA, and AAPI-white. In the structural model, not only were the pathways between the exogenous and endogenous variables added in the equation, but also two endogenous variables, the age of sexual initiation at Wave 1 (DV7) and Wave 2 (DV8) were added. In the structural model testing, we used the standardized mean of each item to form a combined indicator for each latent factor. To compare the differences, we hypothesized that, for the most part, the maternal influences on adolescents' sexual initiation were similar between cultural groups. Hence, we started with the most constrained model (the nested model), which assumed equality between the AAPI and other racial/ethnic groups. The LaGrange Multiplier (LM) test was used to assess whether equality of constraints were not viable or appropriate and whether improvement in fit (drop in X^2 ; $p < .05$) would be obtained if one of the constraints was released. The constraints on the covariances among the exogenous factors and paths of directional influence were released one at a time to assess the most plausible comparison model. Table 13 presents the sequences and the indices when one of the constraints was released in the comparison group. Table 14 provides the fit and misfit indices of the three final structural models. With the fit indices of these comparison models above the suggested .90 and the misfit index (RMSEA) below the suggested .06 (Raykov, Tomer,

& Nesserlroade, 1991), it was concluded that the three comparison models were plausible.

Table 13: Sequences of Constraints Released for each Comparison Model

Groups\Sequences		Nested Model	#1	#2	#3	#4	#5
AAPI-AA	Released Constraint	NM	F3–F4	F1–F2	F5–V8	F1–F4	V8–V7
	S-B X^2 (df), p	62.65 (32); p = .001	53.25 (31); p =.007	42.66 (30); p= .063	33.99 (29); p =.239	26.37 (28); p = .552	18.19 (27); p= .898
	RCFI	.977	.983	.990	.996	1.00	1.00
	Y-B Residual F-test; p value	1.327 32, 1768 P=.105	1.016 31, 1769 p = .442	.885 30, 1770 P= .646	.676 29, 1771 p = .904	.519 28, 1772 p = .982	.408 27, 1773 p =.997
	RMSEA 90%CI	.033 (.020–.045)	.028 (.014–.041)	.022 (.000–.036)	.014 (.000–.030)	.000 (.000–.024)	.000 (.000–.012)
AAPI-HA	Released Constraint	NM	F5–V8	F1–F4	V7, F3	F6–F2	
	S-B X^2 (df), p	47.77 (32); .036	37.33 (31); .201	27.40 (30); .602	21.65 (29); .834	17.71 (28); .933	
	RCFI	.988	.995	1.000	1.000	1.000	
	Y-B Residual F-test; p value	.880 32, 1642 p = .66	.672 31, 1643 p = .915	N/A	.562 29, 1645 p = .97	.391 28, 1646 p = .998	
	RMSEA 90%CI	.024 (.006–.038)	.016 (.000–.032)	.000 (.000–.025)	.000 (.000–.016)	.000 (.000–.009)	
AAPI-White	Released Constraint	NM	F5–V8	F3–F4	F1–F4	F1–F2	
	S-B X^2 (df), p	50.38 (32); .022	38.66 (31); .162	31.22 (29); .357	27.99 (29); .518	24.18 (28); .672	
	RCFI	.996	.998	1.000	1.000	1.000	
	Y-B Residual F-test; p value	1.037 32, 4998 p = .409	.732 31, 4999 p = .859	.621 30, 5000 p = .947	.443 29, 5001 p = .995	.495 28, 5002 p = .988	
	RMSEA 90%CI	.015 (.006–.023)	.010 (.000–.019)	.005 (.000–.016)	.000 (.000–.015)	.000 (.000–.013)	

Table 14: Fit indices for the Three Comparison Models

Fit indices/Comparison Groups	AAPI : AA	AAPI : HA	AAPI : Whites
S-B Chi-square (X^2)	18.187	17.71	24.18
Degree of freedom (df)	27	28	28
p value	.898	.933	.6719
N	433 : 1367	433 : 1241	433 : 4597
Normed Fit Index (NFI)	.987	.987	.994
Non-Normed Fit Index (NNFI)	1.017	1.019	1.002
Robust Comparative Fit Index (RCFI)	1.00	1.00	1.00
Root Mean-Square Error of Approximation (RMSEA)	.000	.000	.000
90% CI of RMSEA	.000-.012	.000-.007	.000-.013

Results

The results of the three plausible comparison models were evaluated. Correlations among the independent latent factor are presented in Table 15. The standardized path coefficients and the variances explained (R^2) of each comparison model are presented in Table 16. As expected, there were more similarities than differences between the AAPI and other racial/ethnic groups. Five similarities were revealed through the model testing. First, negative effects were found for maternal sexual discussion at Wave 1 on adolescents' sexual initiation at Wave 2 for all three comparison models. Second, the positive effects of maternal perceived connectedness on APMSE at Wave 1 and sexual initiation at Wave 1 were similar for the three comparison models. Third, the negative effects of sexual initiation at Wave 1 on APMSE at Wave 2 were observed in all three models. Fourth, the positive associations of mothers' perceived connectedness with APMSE at Wave 1 were obvious among the comparison models. Fifth, the most important finding was the positive association between APMSE and later sexual initiation in the same waves across all of the comparison models. Despite these similarities, several differences also were noted.

Group Differences

AAPI-AA

In the AAPI-AA comparison model, several variations were found. First, the correlations between the exogenous latent factors were different between the AAPI and AA groups (see Table 15). For example, all of the exogenous variables correlated fairly well for the AA adolescents, but this was not the case for the AAPI adolescents. In particular, AAPI mothers' sexual discussion was not correlated either with mothers'

perceived connectedness or with adolescents' perceived connectedness in this model. Another significant difference in the correlations between the AAPI and AA groups was the association between adolescents' perceived general communication and perceived connectedness. It appeared that compared to the AA group, AAPI adolescents' perceived general communication was more strongly associated with adolescents' perceived connectedness (.407: .237 in standardized coefficients). Some differences in path coefficients also were observed between the AAPI and AA groups. First, the magnitude of the associations between APMSE and sexual initiation at the same waves were greater for AAPI adolescents compared to their AA peers (Wave 1: -.342, -.276; Wave 2: -.171, -.143, respectively). Second, the magnitude of the association between sexual initiation at Wave 1 and Wave 2 was greater for the AAPI adolescents than for AA adolescents (.706, .580, respectively). Third, the predictive value of APMSE at Wave 1 for sexual initiation at Wave 2 was only significant for the AAPI group, but not for the AA group.

AAPI-HA

In the AAPI-HA comparison model, several differences were found (see Table 16). First, the correlation between mothers' and adolescents' perceived connectedness was significant for HA adolescents, but not for AAPI adolescents (Table 15). Second, although the association between mothers' perceived connectedness and APMSE at Wave 2 was not significant for both the AAPI and HA groups, the direction of the influences was the opposite. That is, in the HA group, a unique negative association between mothers' perceived connectedness and APMSE at Wave 2 was noted. Although the relationship was not statistically significant, the opposite direction in influence (as compared to AAPIs) signifies its differences in terms of forming APMSE at Wave 2.

Third, another unique and different finding for the HA group was that these adolescents' perceived general communication was not significantly associated with early sexual initiation. Fourth, similar to the AAPI-AA comparison model, the predictive effects of APMSE at Wave 1 on sexual initiation at Wave 2 were only observed for the AAPI group, but not for the HA group.

AAPI-White

In the AAPI-White comparison model, several differences were noted. First, while all of the correlations among the exogenous variables were significant for the white adolescents, two correlations were not significant for the AAPI group (Table 15). For example, AAPI mothers' perceived sexual discussion was not significantly correlated with mothers' perceived connectedness. Also, AAPI mothers' sexual discussion was not significantly related to adolescents' perceived connectedness. Second, the correlation between adolescents' general communication and adolescents' perceived connectedness was stronger for the AAPI adolescents than for whites (.392, .271, respectively). Third, similar to the above two comparison models, the predictive value of APMSE at Wave 1 for adolescents' sexual initiation at Wave 2 was only significant for the AAPI adolescents, but not for these white adolescents.

Table 15: Group Comparisons: Correlations among Independent Variables

Exogenous Variables		F1	F2	F3
F2: Mothers' perceived connectedness	AAPI-AA	-.006 (*.272)	1 (1)	
	AAPI-HA	*.077 (*.077)	1 (1)	
	AAPI-White	-.013 (*.117)	1 (1)	
F3: Adolescents' general communication	AAPI-AA	*.254 (*.254)	*.146 (*.146)	1 (1)
	AAPI-HA	*.260 (*.260)	*.119 (*.119)	1 (1)
	AAPI-White	*.246 (*.246)	*.130 (*.134)	1 (1)
F4: Adolescents' perceived connectedness	AAPI-AA	-.054 (*.131)	*.348 (*.348)	*.407 (*.237)
	AAPI-HA	-.039 (*.163)	*.327 (*.327)	*.364 (*.364)
	AAPI-White	-.058 (*.106)	*.389 (*.389)	*.392 (*.271)

*Statistics are significant at the .05 level; groups with significant differences ($p < .05$) are in **Bold**.

Mediation Effects

Two potential mediation effects of APMSE at Wave 2 were evaluated using the Sobel test on the AAPI-AA and AAPI-White comparison models. In the AAPI-AA model, the proposed mediator, APMSE at Wave 2, failed ($p = .06$) to mediate the relationship between adolescents' general communication and sexual initiation at Wave 2, whereas in the AAPI-White model, the same variable significantly mediated ($p = .0004$) the relationship between mothers' perceived connectedness and sexual initiation at Wave 2. This finding suggests that although adolescents' general communication had direct and negative influences on sexual initiation at Wave 2, some positive influences of general communication were mediated through APMSE at Wave 2 for AA adolescents. However, the protective effects were not significant at the .05 level ($p = .06$).

On the other hand, in the AAPI-White model, although there were no direct effects found between mothers' perceived connectedness and adolescents' sexual initiation at Wave 2, APMSE at Wave 2 was indirectly protective against adolescents' early sexual initiation through its mediation effects on the relationship between mothers' perceived connectedness and adolescents' sexual initiation at Wave 2 (Sobel statistic: -3.499, $p = .0004$).

Variances Explained (R^2)

From these three longitudinal comparison models, in Wave 2, the comparison models explained approximately 60% of the variance in APMSE and 55% of adolescent sexual initiation. In Wave 1, however, the models only explained about 1.5% in APMSE and 20% of in sexual initiation. Overall, the proportion of the variance explained was comparable for the three comparison models; however, the higher percentages of

variance explained in sexual initiation at Wave 1 and Wave 2 were consistently noted for AAPI adolescents compared to adolescents of the other racial/ethnic groups.

Table 16: Group Comparisons: Standardized Path Coefficients and Explained Variance

Exogenous/Endogenous Variables		F5: APMSE at Wave 1	F6: APMSE at Wave 2	DV7: Sexual Initiation at Wave 1	DV8: Sexual Initiation at Wave 2
F1: Maternal sexual discussion	AAPI (AA)	-.025 (-.025)	*-.070 (*-.070)	*.162 (*.133)	*.050 (*.041)
	AAPI (HA)	-.051 (-.051)	*-.044 (*-.043)	*.152 (*.140)	*.088 (*.075)
	AAPI (White)	*-.068 (*-.068)	*-.060 (*-.058)	*.182 (*.177)	*.069 (*.062)
F2: Mothers' perceived connectedness	AAPI (AA)	*.133 (*.136)	.049 (.049)	*-.156 (*-.128)	-.042 (-.035)
	AAPI (HA)	*.160 (*.159)	.083 (-.041)	*-.201 (*-.186)	*-.075 (-.064)
	AAPI (White)	*.119 (*.118)	*.065 (*.062)	*-.186 (*-.180)	-.057 (-.051)
F3: Adolescents' general communication	AAPI (AA)	.003 (.003)	*.053 (*.053)	*.077 (*.063)	*.056 (*.047)
	AAPI (HA)	.016 (.016)	.010 (.010)	*.157 (.004)	.005 (.004)
	AAPI (White)	*-.041 (*-.041)	.006 (.005)	*.058 (*.056)	*.061 (*.055)
F4: Adolescents' perceived connectedness	AAPI (AA)	-.027 (-.028)	-.006 (.006)	*-.078 (*-.064)	*-.070 (*-.059)
	AAPI (HA)	*-.082 (*-.081)	.005 (.005)	-.053 (-.049)	-.007 (-.006)
	AAPI (White)	*.041 (*.041)	-.007 (-.006)	*-.065 (*-.063)	*-.048 (*-.043)
F5: APMSE at Wave 1	AAPI (AA)		*.722 (*.704)	*-.342 (*-.276)	*-.182 (-.011)
	AAPI (HA)		*.721 (*.716)	*-.305 (*-.284)	*-.159 (-.002)
	AAPI (White)		*.751 (*.725)	*-.301 (*-.294)	*-.151 (-.006)
F6: APMSE at Wave 2	AAPI (AA)				*-.171 (*-.143)
	AAPI (HA)				*-.152 (*-.132)
	AAPI (White)				*-.143 (*-.135)
DV7: Sexual initiation, Wave 1	AAPI (AA)		*-.091 (*-.110)		*.706 (*.580)
	AAPI (HA)		*-.084 (*-.090)		*.682 (*.630)
	AAPI (White)		*-.054 (*-.054)		*.686 (*.638)
R²: Variance explained (%)	AAPI (AA)	1.6 (1.6)	60.1 (56.9)	20.4 (12.0)	56.6 (44.6)
	AAPI (HA)	2.4 (2.6)	59.6 (56.0)	20.5 (15.4)	54.0 (50.9)
	AAPI (White)	2.5 (2.2)	62.4 (57.7)	20.4 (17.9)	54.7 (53.2)

*Statistics are significant at the .05 level; groups with significant difference ($p < .05$) are in **Bold Italic**. Signs changed from positive to negative are **underlined**

Discussion

Several important findings were noted from these comparison models. First, when comparing correlations among latent factors across these comparison models, the associations among AAPI mother-adolescent interaction factors (F1–F4) were significantly different from those for AAs, HAs, and whites (Table 15). For example, unlike the other groups, AAPI mothers' perceptions of sexual discussion were not

significantly associated with maternal or adolescent's perceived connectedness. The lack of an association between AAPI maternal sexual discussion and maternal (or adolescents') perceived connectedness might result from AAPI mothers' unfamiliarity (or inevitable needs) for such discussion. Although there are positive associations for AAs, HAs, and whites between maternal sexual discussion and maternal (or adolescents') perceived connectedness, the effects of maternal sexual discussion alone was not protective against adolescents' early sexual initiation at either Wave 1 or Wave 2. Instead, unexpectedly, maternal sexual discussion was negatively associated with APMSE at Wave 2 and, for all groups, with adolescents' sexual initiation at both waves. This negative association seems to suggest that maternal sexual discussion focusing primarily on the negative consequences may not be protective in terms of delaying adolescents' sexual initiation or for increasing adolescents' perceived maternal sexual expectations (APMSE), and, in fact, may have increased adolescents' risk for engaging in early sexual activity.

Second, mothers' perceived connectedness emerged as an important predictor for APMSE and adolescents' later sexual initiation at Wave 1 for all groups. In the AAPI-HA comparison model, mothers' perceived connectedness was shown to have a direct protective effect on the AAPI adolescents' sexual initiation at Wave 2, that is, it was negatively associated with age at sexual initiation. However, this effect was not significant for the HA adolescents. This difference might be the result of the different degree that individualism is valued between the AAPI and HA groups. Although there is no direct comparison of cultural values available here between these AAPIs and HAs, one study using whites as the reference group found that there was no difference in

attitudes concerning individualism between whites and Hispanics. However, in the same study, they found whites had a significantly higher level of individualism than AAPIs (Brewer & Chen, 2007; Oyserman, Coon, & Kemmelmeier, 2002). Hence, it is possible that AAPI home cultural values were less individual-focused than those of HAs, so the exclusive predictive values of AAPI mothers' perceived connectedness on adolescents' sexual initiation at Wave 2 might be the result of AAPI's less individualized cultural values. In addition, the significant mediation effects of APMSE on the relationship between mothers' perceived connectedness and adolescents' sexual initiation at Wave 2 in the AAPI-White model verified the indirect protective role of mothers' perceived connectedness for AAPI and white adolescents.

Third, in the three comparison models, adolescents' perceived general communication was associated with earlier sexual initiation for the AAPI, AA, and White adolescents, but not for the HA adolescents. In the AAPI-AA comparison model, adolescents' perceived general communication was associated with a higher level of APMSE at Wave 2, which was significantly associated with later sexual initiation at Wave 2. Although an indirect effect was noted, the level of the mediation effects of APMSE at Wave 2 was not significant when using the Sobel test ($p = .06$). The above finding suggests that although the effects of adolescents' general communication was not, as expected, to be protective, the potential positive effects might exist for HA and AA adolescents. It is possible that a cross-cultural difference might exist for adolescents particularly on how adolescents interpret the meaning of general communication between mothers and adolescents. It is possible that HA and AA adolescents might respond better

to their general communication with their mothers and do not mistake the general communication as a permissive attitude toward sexual initiation.

Fourth, the effects of adolescents' perceived connectedness varied among these three comparison models. For example, adolescents' connectedness was associated with later sexual initiation for the AAPI-AA and AAPI-White comparison models at both waves, but it was not significant in the AAPI-HA comparison model. On the contrary, in the AAPI-HA model, adolescents' perceived connectedness was negatively associated with APMSE at Wave 1. This suggests that although there were no significant differences between AAPIs and the other racial/ethnic groups, some differences may exist for the AA, White, and HA groups. It appears that for AAs and whites, adolescents' perceived connectedness emerged as a protective factor for early sexual initiation at both waves; however, this was not the case for these HA adolescents. This variation might be resulted from different cultural aspects of how adolescent might perceive their connectedness with their mothers. It is possible that adolescents from newly immigrant families (e.g., HA and AAPI adolescents) might be accentuate on collective cultural perspectives and consequently less influenced by their individual-focused connectedness with their mothers as compared to those of AA and white adolescents. Consequently, HA adolescents' perceived connectedness with their mothers may not be as predictive as for AA and white adolescents.

Fifth, the most important finding of this study is the significant role of APMSE on adolescents' sexual initiation for all these groups. The influences of APMSE were verified in two ways. The correlations between APMSE and sexual initiation in the same waves were significant for all groups; in addition, the predictive values of APMSE at

Wave 1 on sexual initiation at Wave 2 were significant for the AAPI adolescents. The different effects of adolescents' perceived maternal sexual expectations (APMSE) may be rooted in the different cultural values between AAPIs and the other racial/ethnic groups studied. Because AAPI cultural values have more of a collective focus than those of other racial/ethnic groups, it is possible that how these AAPI adolescents perceived their mothers' expectations exerted a greater influence on their decision about whether or not to become sexually active. Hence, it is not surprising that the effects of APMSE were strongest for AAPI adolescents. Although the predictive effect of APMSE was not significant for AAs, HAs, or whites, it is important to note the strong correlations between APMSE and later sexual initiation for all of these groups.

Summary

The purpose of this study was to compare cultural differences in maternal influences between AAPIs and other racial/ethnic groups. The maternal influences were examined by comparing the effects of mother-adolescent interactions (i.e., sexual discussion, general communication, perceived connectedness, and perceived expectations) on adolescents' sexual initiation among the selected racial/ethnic groups. Several major findings were noted. First, when examining mothers' perceptions of sexual discussion and perceived connectedness, AAPIs were significantly different from other racial/ethnic groups. That is, AAPI maternal or adolescents' connectedness was not associated with mothers' report of sexual discussion. This unique lack of an association might indicate a cultural variation. Yet, despite this cultural variation, a similarity was found for all groups—maternal sexual discussion alone did not protect these adolescents

against early sexual initiation. Instead, for all the groups, protective effects were found for mothers' perceptions of connectedness.

Second, when adolescents' perceptions of general communication and connectedness were examined, the effects of adolescents' general communication in the AAPI-HA model were different from those of either the AAPI-AA or AAPI-White models, where a negative association with early sexual initiation at both waves was present. Furthermore, the protective effects of adolescents' perceived connectedness for the AAPI-HA model also were different from the AAPI-AA and AAPI-White models.

Although a direct comparison of the differences among these four groups cannot be made, by using AAPI adolescents as the reference group, a subtle difference was observed. It appears that the HA group was the only one where a negative association was not found between adolescents' general communication and early sexual initiation. This finding suggests that, unlike adolescents of other racial/ethnic groups studied, HA adolescents do not mistake general communication as indicating a permissive attitude toward sexual initiation. Hence, a possible way to delay HA adolescents' sexual initiation might be to promote effective general communication between HA adolescents and their mothers. In addition, the significant mediation effects of mothers' perceived connectedness (through APMSE at Wave 2) in the AAPI-White model further signified its protective influence on sexual initiation.

The study's results suggest that although there were few significant differences in mother-adolescent interactions when comparing AAPIs to African Americans, Hispanic Americans and Whites, there were some differences detected among these groups when AAPIs were used as the reference group. When equality of constraints was applied in the

comparison models, the results tended to lean towards the group with the largest sample size. Since the AAPI group was smallest, it is likely that the results reflected the comparison group (i.e., AA, HA, or whites). Therefore, the different results for these three comparison models suggests that AA and white adolescents' sexual initiation were similarly influenced by adolescents' perceived connectedness. This influence, however, was not apparent in the HA adolescents. One possible explanation for this variation may be due to cultural differences in mother-adolescent interactions. It is possible that adolescents from different cultural backgrounds may interpret general communication differently. Hence, it is important to consider cultural variations when designing nursing intervention programs.

From these three comparison models, although maternal influences generally were found to be similar among the four cultural groups (i.e., the effects of maternal sexual discussion, mothers' perceived connectedness, and APMSE), several important differences were noted. For AAPI adolescents, the most important maternal influences were the effects of APMSE at Wave 1, whereas for the other groups, maternal influences were found to be slightly different. For example, compared to the white group, adolescents' perceived general communication was one of the positive maternal influences in both the AA and HA groups. The positive associations between adolescents' general communication and APMSE at Wave 2 in the AAPI-AA model and the absence of negative effects of adolescent's perceived general communication in the HA group suggests that promoting general communication may be an effective strategy for delaying sexual initiation among AA and HA adolescents. On the other hand, the positive mediation effects of mothers' perceived connectedness in the AAPI-White model

suggests the importance of promoting mother-adolescent connectedness in AAPI and white adolescents.

Limitations

Although these three plausible models revealed several important cultural variations in maternal influences, several limitations are worth mentioning. First, the study was a secondary data analysis. Since the data were not originally collected for this research study, it is possible that the latent constructs were less than perfect. It would be important for future study to further examine the contents of each latent constructs. Second, the APMSE construct is fairly new thus should be further explored to verify its influences on sexual initiation. It is important for future studies to develop a psychometrically sound instrument to measure APMSE and its relationship with adolescents' sexual attitudes. Such an exploratory study could provide new information about maternal influences and how maternal (or parental) influences might be considered when designing programs to prevent early sexual initiation. Third, although the sample size of each group was large enough to have sufficient power to generate acceptable results, the large differences in sample sizes between the reference and comparison groups may have generated results that were more likely to lean toward the comparison group. Hence, direct comparison among all three models in this study would be misleading. However, an indirect comparison using AAPI as the reference group was attempted and assessed. As a result, any inferences from these indirect comparisons should be taken with caution.

Implications

Several implications can be derived from this study. First, although maternal sexual discussion might be important in promoting safe sex practice among adolescents (e.g., condom use) and delaying adolescents' sexual initiation, a strategy that solely seeks to promote maternal sexual discussion that primarily focus on negative consequences of sex might not be useful. Instead, promoting mother-adolescent connectedness might be more effective for encouraging healthy adolescent choices about their sexuality. Second, APMSE emerged as an important predictor of adolescents' sexual initiation, particularly for AAPI adolescents. Since APMSE at Wave 1 successfully served as a mediator between mothers' perceived connectedness and sexual initiation at Wave 2 for these AAPI adolescents—a significant difference from the other models tested with the other racial/ethnic groups—it could be concluded that maternal influences differ by the variations in cultural context. One effective way to delay AAPI adolescents' sexual initiation may be to promote their perceived maternal sexual expectations (APMSE). Third, from the comparison models, it also was found that minority adolescents such as AAs and HAs tended to respond well from the general communication with their mothers (i.e., with a higher level of APMSE or a non-negative relationship with sexual initiation). Hence, for some racial/ethnic groups, promoting general communication between mothers and adolescents may be an important way to increase APMSE and/or to delay sexual initiation. However, since this was a secondary data analysis, some constructs used in this analysis were less than perfect and therefore further research is needed to explore these constructs.

When promoting maternal involvement in adolescent sexual health, cross-cultural differences also should be considered. For example, to promote adolescents' sexual health, nursing practice should not be limited solely to promoting mother-adolescent sexual discussion; rather, nurses should aim to increase positive maternal influences by promoting mother-adolescent connectedness and adolescents' perceived maternal sexual expectations. In addition, for these racial/ethnic minority groups, one way to increase adolescents' perceived expectations may be to focus on improving mother-adolescent's general communication. In conclusion, although some differences were observed among the studied racial/ethnic groups, the importance of maternal influences on adolescents' sexual initiation is irrefutable. Furthermore, culturally responsive nursing interventions should be the focus of future study and practice.

CHAPTER IV

Gender and Acculturation Influences on AAPI Adolescents' Interactions with their Mothers and their Sexual Initiations

Abstract

The purpose of this study was to examine gender and acculturation influences on Asian American Pacific Islanders (AAPI) adolescents' sexual initiation and their interactions with their mothers. A gender comparison model and an acculturation covariate model were evaluated using the base AAPI model (Figure 7) as the a priori model. Structural equation modeling (SEM), specifically EQS 6.1 for Windows, was used for this exploration. The fit and misfit indices show the models fit the data fairly well. In the gender comparison model, the fit indices were S-B $\chi^2 = 25.33$, 31df, $p = .753$ female $N = 210$, male $N = 223$; NFI=.926; NNFI=1.00; CFI=1.00, RMSEA = .000. In the acculturation model, the fit indices were $\chi^2 = 102.41$, 51df, $p = .442$ $N = 433$; NFI=.963; NNFI=1.063; CFI=1.00; RMSEA=.000.

The gender comparison model noted two major differences between AAPI males and females. First, the association between mothers' perceptions of sexual discussion and adolescents' perceived maternal sexual expectations (APMSE) at Wave 1 was negative for AAPI adolescent females, but it was positive for adolescent males. Second, the association between adolescents' sexual initiation at Wave 1 and Wave 2 was significantly stronger for females compared to males. In the acculturation covariate model, AAPI adolescents' English language spoken at home was associated with more

frequent maternal sexual discussion, higher level of mothers' perception of connectedness, higher level of APMSE at Wave 1, and later sexual initiation at Wave 1. On the other hand, the adolescents' years of U.S. residence was associated with adolescents' higher level of perceived connectedness and later sexual initiation at Wave 2. Gender and acculturation influences on AAPI adolescents' interactions with their mothers and their sexual initiation are discussed as well as the implications and limitations of this study.

Introduction

The purpose of this study was to use the base AAPI model (Figure 7) to further examine gender and acculturation influences on adolescents' sexual initiation and their interactions with their mothers. To examine the possible gender differences in how AAPI adolescents perceived maternal sexual expectations and its influences on their sexual initiation, a gender comparison model was examined to compare the differences between AAPI adolescent males and females. To understand the acculturation influences on AAPI mother-adolescents' interactions, adolescents' perceived maternal sexual expectations and sexual initiation, a covariate model was explored using adolescents' self-reported language spoken at home (English or other) and their length of residence in the United States as independent variables. Structural equation modeling (SEM), specifically EQS 6.1 for Windows, was used for the model testing. Several fit and misfit indices were used to assess the model fit between the models and data, including scaled Storra-Bentler X^2 (S-B X^2), the Bentler-Bonnett Normed Fit Index (NFI), the Bentler-Bonnett Non-Normed Fit Index (NNFI), the Comparative Fit Index (CFI), and Root Mean-Square Error of Approximation (RMSEA).

Although there are no explicit criteria to determine what the best indicator for acculturation is, the level of acculturation often has been measured by how immigrants live in their everyday lives. For instance, immigrants' level of acculturation have been assessed by immigrants' fluency with the host country language (Yu, Huang, Schwalberg, Overpeck, & Kogan, 2002), the length of residence in the host country (Chung, 1998; Merali & Violato, 2002; Shapiro & Vives, 1999; Wilton & Constantine, 2003), the selection of a particular food or television program, and/or self-identified socialization (Chung, 1998; Hieshima & Schneider, 1994; Merali & Violato, 2002; Phinney & Chavira, 1995; Tinsley, Lees, & Sumartojo, 2004). In this study, two attributes of acculturation were used as two covariates, including adolescents' self-reported language spoken at home and adolescents' length of U.S. residence. Recognizing that acculturation is a complex construct with multiple attributes, it was decided to use these two independent variables—English language spoken at home and length of U.S. residence—and to assess their effects independently.

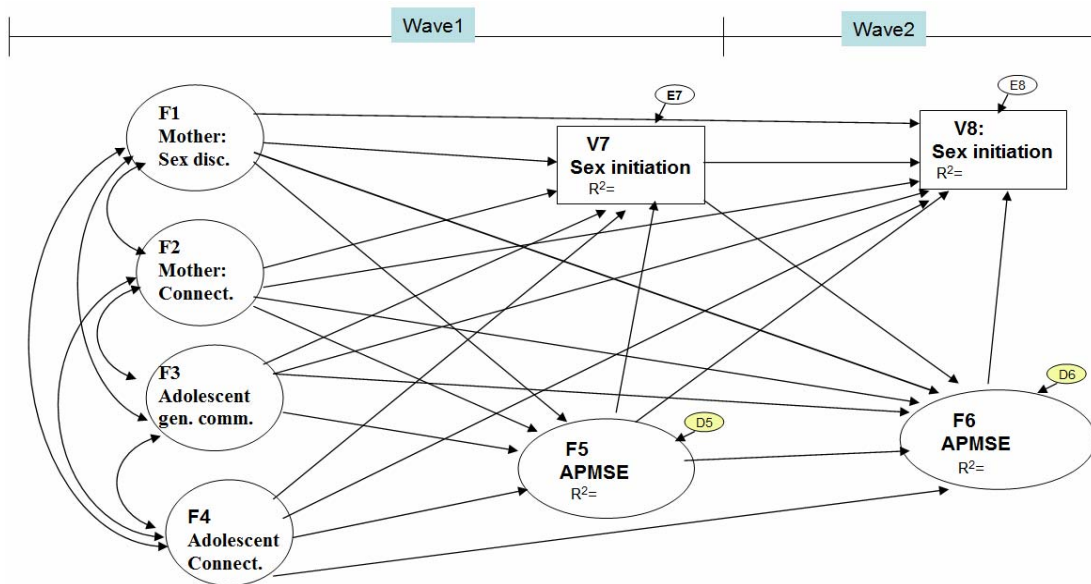


Figure 7: A Priori Model

Background and Significance

Although there has been a considerable amount of research on how important maternal influences might be in influencing adolescents' sexual behaviors (Aronowitz, Rennells, & Todd, 2005; Crosby et al., 2001; Dittus & Jaccard, 2000; Dittus, Jaccard, & Gordon, 1999; McDowell, Parke, & Wang, 2003; Miller, Kotchick, Dorsey, Forehand, & Ham, 1998), there is limited understanding about such maternal influences on AAPI adolescents' sexual behavior, particularly when gender and acculturation influences also are considered. While there are many different perspectives regarding the role that culture plays in an individual's health behavior (Allen, 1999; Berry, Kim, Boski, Kim, & Gudykunst, 1988; Kaplan et al., 2003; Smith, 2004; Swanson, 1989; Willgerodt, Miller, & McElmurry, 2002), the perspective underlying this study was that "gender is always cultured" (Allen, 1999, p. 230) and "culture is not a static object of analysis but a multiplicity of negotiated realities within historically contextualized communicative processes" (Salazar, 1991, p. 98). A review of mother-adolescent interactions (especially mothers' perceptions of sexual discussion and perceived connectedness with their adolescents and adolescents' perceived general communication and connectedness with their mothers), adolescents' perceived maternal sexual expectation (APMSE), and adolescent sexual initiation was discussed in Chapter II.

Gender

Although a recent hypothesis on gender similarities (Hyde, 2005), tested through a meta-analysis, suggested that males and females behave more similarly than differently, research has consistently shown that in term of sexual attitude toward casual sex, males are significantly different from females (Oliver & Hyde, 1993). In many Asian cultures,

gender is an important element related to cultural attributes defining how adolescents should behave. In fact, research has suggested that parental sexual communication is seldom uniform (Baxter & Clark, 1996; Bettinger et al., 2004; Clawson & Reese-Weber, 2003; Jackson, Bijstra, Oostra, & Bosma, 1998; Karofsky, Zeng, & Kosorok, 2000; Kirkman, Rosenthal, & Feldman, 2002). Instead, gender differences are persistently seen within families. For example, mothers are more likely to provide information on sexual issues to their adolescents than are fathers (DiIorio, Kelly, & Hockenberry-Eaton, 1999; Miller, Kotchick, Dorsey, Forehand, & Ham, 1998). Girls are more likely to be recipients of sexual communication than are boys (Fisher, 1987, 1993). In addition, the sexual messages from parents had different standards for adolescent males than for females. Research (Downie & Coates, 1999; Moore & Rosenthal, 1991) showed that messages delivered to daughters were restrictive in nature and frequently stressed the negative consequences of sexual intercourse, whereas messages to sons were more subtle in nature, which sometimes encouraged sexual exploration and pleasure. In a retrospective study, Kim and Ward (2007) found that Asian American females were more likely to report receiving gendered and prohibitive messages as well as more information about pregnancy from their mothers than the males were. Furthermore, because of culturally rooted modesty for females in Asian culture (Mo, 1992), AAPI females may perceive their maternal sexual expectations (APMSE) differently from those of AAPI males. Hence, when investigating maternal influences among AAPI adolescents, it is important to understand whether the formation of APMSE is different between AAPI males and females and whether APMSE can provide the same degree of protectiveness for both genders.

Traditionally, gender often is a preceding factor for different interpersonal dynamics between mothers and adolescents among many Asian cultures as a result of different traditional cultural expectations about appropriate behaviors for the sexes (Spence & Helmreich, 1978). Some studies (Hahm, Lahief, & Barreto, 2006; Ray-Mazumder, 2001; Tang, Wong, & Lee, 2001; Upchurch, Levy-Storms, Sucoff, & Aneshensel, 1998) have suggested that adolescents' relationships with their mothers and their level of acculturation may influence their sexual behaviors differently, according to their gender. Since there is limited research available to understand gender influences on sexual behaviors of AAPI adolescents, it is important to assess whether 1) AAPI adolescents' perceptions of maternal influences differ by gender, 2) AAPI females perceive their maternal sexual expectations differently than do AAPI males, and 3) APMSE provides the same degree of protection for both AAPI females and males.

Acculturation

Studies from various acculturation models (Berry, 1985; Berry, Kim, Boski, Kim, & Gudykunst, 1988; Dressler & Bernal, 1982; Roysirca-Sodowsky & Maestas, 2000) often link the level of acculturation with immigrants' health behaviors. Studies suggested that as AAPIs become more acculturated to mainstream American culture, their health attitudes and sexual behaviors become more similar to the white American norm (Okazaki, 2002). For example, Hahm and colleagues (2006) found AAPI adolescents' sexual experience was related to adolescents' higher level of acculturation when acculturation was measured by the birth place and language speaking at home. On the other hand, Yu and colleagues (2002) found a positive association between level of acculturation and AAPI adolescents' better health behaviors when acculturation was

measured by their English speaking at home. The variation in finding may be related to how the level of acculturation was measured or defined. In reality, AAPI adolescents' level of acculturation may be influenced by various factors such as adolescents' acculturation stress as well as their parents' level of acculturation, educational background, and/or socioeconomic status. For example, more acculturated mothers may be able to alleviate acculturation stresses experienced by their adolescents. It is possible that while the majority society exerts pressure for immigrants to conform to majority societal norms, different cultural values that mothers have at home may have varying degrees of impact on their adolescents' health behaviors. Hence, it is important to consider mothers' level of acculturation when investigating acculturation influences on AAPI adolescents' sexual behavior. Although there is limited understanding regarding the influences of AAPI mothers' level of acculturation, several between-groups studies (Lebra, 2000; Murthy, 1998; Rothbaum, Pott, Azuma, Miyake, & Weisz, 2000) found that AAPI adolescents more frequently reported less maternal warmth and acceptance than their white adolescent peers. Murthy (1998) further suggested that Asian parents focused primarily on their children's economic future, rather than on their overall psychological development. Murthy suggested that inadequate sexual communication in many Asian Indian immigrant households may lead to severe tension between parents and their adolescents when the young people demand freedom to date and choose their spouses. Acculturative stress may occur when an individual's adaptation resources are not sufficient to support adjustment to a new environment (Dressler & Bernal, 1982). In addition, the effects of acculturation may be very different between adolescents who have recently immigrated and those who are second (born in U.S.) or third generation AAPI

adolescents. For this reason, it is important to be cautious about how the level of acculturation is determined when investigating its influences on AAPI adolescents' sexual initiation. Two attributes were selected to represent adolescents' levels of acculturation including AAPI adolescents' U.S. residence and their selected language speaking at home.

Length of U.S. residence

Although there is limited understanding about what are the best components to represent level of acculturation, the length of residence in the host country often is used as an important variable to determine the level of acculturation (Chung, Bemak, & Wong, 2000; Rodriguez, Myers, Morris, & Cardoza, 2000; Wilton & Constantine, 2003). For instance, research (Wilton & Constantine, 2003) has found that length of residence in the U.S. was negatively associated with symptoms of psychological distress in Asian and Hispanic American international college students. The notion of acculturation is that the longer the immigrant remains in the host country, the more likely he/she is to adopt the cultural values of the host country, which might be reflected in their decision of which language to speak at home and what kind of health behavior one would practice. Generally speaking, more acculturated individuals are more likely to speak the language and adopt the cultural values of the host country (Phinney & Chavira, 1995).

On the basis of the literature on acculturation, it often was assumed that more acculturated adolescents would behave more similar to white adolescents (Okazaki, 2002). This conclusion often was derived from between-groups (or between-countries) comparisons. However, when the purpose of a study is to understand within-group variance, such as to explicate maternal influences on AAPI sexual behaviors within

groups residing in the United States, the acculturation hypotheses should focus on whether the possible effects exist for the conditions of this particular population. That is, the influences of acculturation on both adolescents and mothers should be considered. In fact, Yu and colleagues (2002) found a positive association between those AAPI adolescents who spoke English at home and their general health behaviors (i.e., less physical and psychological health risks).

While the length of residence could be used as a reference point for the level of acculturation, it is important to note the relationship between length of residence and the level of cultural assimilation is not necessary linear. Other factors determining how well the immigrant socializes within the society are equally important. For example, the immigrant's ability to speak the host country language, their socio-economic status, their acceptance by the host society, and their adoption of the host country's cultural values also may play important roles in how well the immigrant's acculturation status is. Although the length of residence may be used to suggest the length of mothers' residence, it may not reflect other elements associated with mothers' level of acculturation, such as mothers' desires, needs, or educational resources toward acculturation.

Language spoken at home

In the study reported here, English spoken at home was selected as one attribute to reflect the level of acculturation for AAPI adolescents and their mothers since communication is reciprocal. Because immigrant children generally are able to learn a new language much quicker than their parents, its indicative values should not be limited to reflect AAPI adolescents' level of acculturation. Instead, English spoken in AAPI

immigrant homes might also be used to reflect their mothers' capacity to understand English. For example, those mothers with the ability to understand English might be more acculturated and have the capability to socialize within American society. Considering mothers' ability to understand English is important because research has shown that language barriers between mothers and adolescents may pose a significant obstacle toward a successful sexual communication (Kao, 2007; Kim & Ward, 2007). This barrier also may impede the process of adolescents' development. With the ability to understand and communicate in English, acculturated AAPI mothers might have better knowledge and ability about how to provide support to their adolescents when bicultural conflicts (stress) occur, compared with those mothers who do not have such skills. Also, those AAPI adolescents who speak English at home may suggest a higher level of mothers' education and/or the mothers' acceptance of American society. This is because the ability of immigrants to speak or understand the host country language requires a certain level of education as well as need and desire. Hence, by using adolescents' language spoken at home as an independent variable, we could understand more about acculturation influence that is beyond what we could learn from adolescents' length of residence.

In sum, many studies (Berry, Kim, Boski, Kim, & Gudykunst, 1988; Dressler & Bernal, 1982; Hahm, Lahiff, & Guterman, 2004; Hyman & Dussault, 2000; Lee, Sobal, & Frongillo, 2000) have suggested that some individual demographic and social characteristics are related to the process of acculturation, including age, gender, socioeconomic status, length of residence in the host country, and the ability to speak the host country's language. For example, acculturation was measured by the language spoken at

home when Hahm and colleagues (2004) found an association between the level of acculturation, binge drinking, and the level of sexual activities (Hahm, Lahief, & Barreto, 2006) among Asian American adolescents.

Although adolescents' length of U.S. residence and their language speaking at home can reflect some degree of AAPI adolescents' level of acculturation, it is important to note that these two attributes may not represent every aspect of acculturation; therefore, these two attributes should only be used to reflect some aspects of acculturation of adolescents and their mothers. In particular, regarding the effects of acculturation, results may be mixed when using different theoretical frameworks. Hence, it is important to consider the theoretical framework used for the study.

Theoretical Frameworks

Bronfenbrenner's Social Ecological Model (Wilson, 2003) was used as the underlying theoretical framework to understand the influence of acculturation on how AAPI mothers interact with their adolescents, how adolescents perceive their mothers' sexual expectations (APMSE), and their possible impacts, over time, on adolescents' sexual initiation. Since Bronfenbrenner's Social Ecological Model places a heavy emphasis on environmental factors (Wilson, 2003), our hypotheses were derived with consideration of adolescents' contextual influences, including variables such as adolescents' gender, language spoken at home, and length of residence in the United States. Another underlying theory used to guide this study was the expectancy violation-realignment model (Collins & Luebker, 1994), which postulates that through interactions, both parent and adolescent constantly realign their expectations (and behaviors) with

each other. The authors posit that the constant realignment also occurred in the process of acculturation for these adolescents and mothers.

Although gender and culture often are included in among the demographic categories for analysis, gender and culture should not be treated as constant (or static) entities (Allen, 1999). Instead, culture (or cultured gender) should be considered as an important background factors that are constantly evolving. So, when attempting to understand the influences of acculturation on how AAPI mothers may influence their adolescents' sexual initiation, two covariates were selected to represent adolescents' levels of acculturation, the language spoken at home and length of U.S. residence.

Although the data in this study were obtained from the adolescents, the possible effects of the mothers' acculturation have not been ignored. For example, AAPI adolescents' reports on English spoken at home may be an indication of their mothers' ability to understand English, and the length of adolescents' residence in the U.S. may also imply their mothers' length of U.S. residence for those adolescents who were not born in the United State. However, because the way the length of residence was calculated (i.e., if adolescents were born in U.S., the length of residence is equal to their age), the length of family residence in US was not reflected in this variable. That is, with our calculation, a fifteen-year old AAPI adolescent who is a third or fourth generation immigrant will have same years of US residence as a second generation immigrant.

In sum, when acculturation factors were incorporated into the equation and an attempt was made to understand AAPI maternal influences on adolescents' sexual initiation, the effects an acculturated mother might have on adolescents' sexual behaviors

also were considered. Given these considerations, the following hypotheses were derived.

Hypothesis 1: gender differences

It was predicted that there would be some gender differences in how AAPI mothers interacted with their adolescents and how adolescents perceived their maternal sexual expectation (APMSE). Specifically, it was expected that the effects of maternal sexual discussion would be significantly different between AAPI adolescent males and females. It also was expected that the effects of APMSE would be significantly different between AAPI adolescent males and females.

Hypothesis 2: Language spoken at home

There will be a positive association between AAPI adolescents' English spoken at home and mother-adolescent interactions, such as mothers' perceptions of sexual discussion, connectedness, and adolescents' perceived general communication and connectedness. Adolescents' speaking English at home will be positively associated with APMSE at Wave 1 and Wave 2 and negatively associated with sexual initiation at Waves 1 and 2.

Hypothesis 3: Length of residence

Adolescents' length of residence will be positively associated with mother-adolescent interactions and APMSE at Waves 1 and 2. Accordingly, it was expected that the longer the length of U.S. residence of AAPI adolescents, the less likely they would experience sexual initiation at earlier ages. However, it was anticipated that the effects of the length of U.S. residence would not be as significant as the language spoken at home.

Methods

Sample and Procedure

Add Health is a longitudinal study of a nationally representative sample of youth who were in grades 7 to 12 in Wave 1 (April 1995–December 1995). The Add Health sample was selected from the enrollment roster of 132 schools. To ensure a representative sample of adolescents, the Add Health study designers stratified schools by region, urbanicity, type, and racial composition. At Wave 1, roughly about 50,000 adolescents completed in-school questionnaires, and about 20,745 of them participated in the Wave 1 in-home interview. More than 14,700 adolescents were interviewed again at the Wave 2 in-home interview (January 1996–December 1996). At the Wave 1 in-home interview, one of the adolescent's parents (preferably the mother) was interviewed separately for about 30 minutes. The restricted-use Add Health dataset, which was chosen for this longitudinal study, included variables from Waves 1 and 2. Wave 3 was not included in this study because many maternal variables were not reassessed at Wave 3. Prior to conducting the secondary analysis, IRB approval was obtained from the Health Science Human Subjects Review Committee at the University of Michigan (HUM00011883) on March 21, 2007.

The inclusion criteria for the present study were set to select AAPI adolescents 1) whose ages were between 15 and 17 at Wave 1, 2) who had completed both the Wave 1 and 2 in-home interviews, and 3) whose mother had participated in the Wave 1 interview. The exclusion criteria were set to exclude those adolescents who had confounding factors, such as adolescents who had an unreliable report about the timing of sexual initiation (e.g., reported having sex prior to their date of birth or after the interview date).

Also, adolescents who reported their sexual initiation occurred prior to age 10 also were excluded because of concerns that sexual activity at such an early age was likely to be nonconsensual, such as incest, rape, or coerced sexual intercourse. The final sample for this longitudinal secondary data analysis included 433 AAPI adolescents and their mothers. Table 17 represents the distributions of the sample used for this analysis. Missing data were handled with built-in Pair algorithm, which allowed concurrent use of robust statistics which are appropriate for the data that are apart from normal distribution. or had categorical variables in the SEM model (Muthén & Kaplan, 1985).

Measures

Although mother-adolescent interactions (e.g., perceived connectedness and sexual or general communication) are important factors that may influence adolescents' sexual behaviors, other factors, such as AAPI adolescents' gender and their level of acculturation, also may have an impact on their sexual behaviors. Investigating these factors is essential because research has found associations between acculturation and risky activities (e.g., early sexual initiation, unprotected sexual activity, and unwanted pregnancy) among minority youth (Grunbaum, Lowery, Kann, & Pateman, 2000; Kalmuss, Davidson, Cohall, Laraque, & Cassell, 2003). Hence, it is important to explore maternal influences on AAPI adolescents' sexual initiation in conjunction with other known characteristics and demographic factors such as gender, years of U.S. residence and language spoken at home.

Table 17: Frequency Distribution of AAPI Characteristics and Demographic

	Ages			Gender		subtotal	
Ethnic subgroups *	15	16	17	Male	Female	N	percentage
Chinese	42	38	24	54	50	104	24.0%
Filipino	47	97	83	115	112	227	52.4%
Japanese	10	13	8	16	15	31	7.2%
Asian Indian	2	5	3	4	6	10	2.3%
Korean	10	7	2	7	12	19	4.4%
Vietnamese	2	2	6	4	6	10	2.3%
Other Asian	20	23	24	36	31	67	15.5%
*Subtotal	116	173	144	223	210	433	
Percentage	26.7%	40.0%	33.3%	51.5%	48.5%		

*Note some adolescents self-identified as belonging to more than one Asian subgroup

Variables in the base AAPI model

There were four latent factors representing mother-adolescent interactions including mothers' perceived sexual discussion and connectedness and adolescents' perceived general communication and connectedness. There are four dependent variables in the base AAPI model—APMSE at Waves 1 and 2, and sexual initiation at Waves 1 and 2. The descriptive statistics and the reliabilities of the observed variables of latent factors used in the measurement model are given in Table 18. More detailed information about these measures is provided in Chapter II. It should be noted that in the structural model, a composite variable was formed and used to presents each latent factor (F1–F6), instead of multiple indicators used in measurement model. The composite variables were constructed using the means of standardized observed variables. Pearson correlations of composite variables are presented in Table 15 (Chapter III). To understand gender and acculturation influences, this present study included three additional independent variables (i.e., gender, language spoken at home, and length of US residence) in the model testing.

Additional Variables

Gender

The gender variable was identified by self-reported bio-gender (1 = male; 0 = female) and was verified by the interviewer. This variable was used to separate the data into two subgroups (males and females) for comparison. There were slightly more males than females in the a priori gender comparison model (males = 223; females = 210) (see Figure 7).

Acculturation variables

Two attributes of acculturation were investigated in this study—the adolescents' self-reported language spoken at home and their years of U.S. residence. The language spoken at home was obtained by self-report (1 = English; 0 = others). This variable was treated as one of the independent variables (IV9) to examine its influences on the dependent variables. The second independent variable (IV10), adolescents' length of U.S. residence, was calculated by several items. For example, if an adolescent was born in the United States, the difference between their birthday and the interview date (at Wave 1) represented the length of U.S. residence. If an adolescent was not born in the United State, then the difference between their arrival date and the interview date (at Wave 1) was calculated as the length of residence. The years of residence (IV10) was treated as a continuous variable. For testing the acculturation model, all the latent factors (F1–F6) and adolescents' sexual initiation at Waves 1 and 2 were treated as dependent variables (see Figure 8). This approach was to assess the effects of these two covariates (language at home and length of U.S. residence) on AAPI mother-adolescent interactions (F1–F4), APMSE (F5–F6), and sexual initiation (DV7 and DV8). The descriptive

statistics of adolescents' gender, years of U.S. residence, and language spoken at home are presented at Table 20.

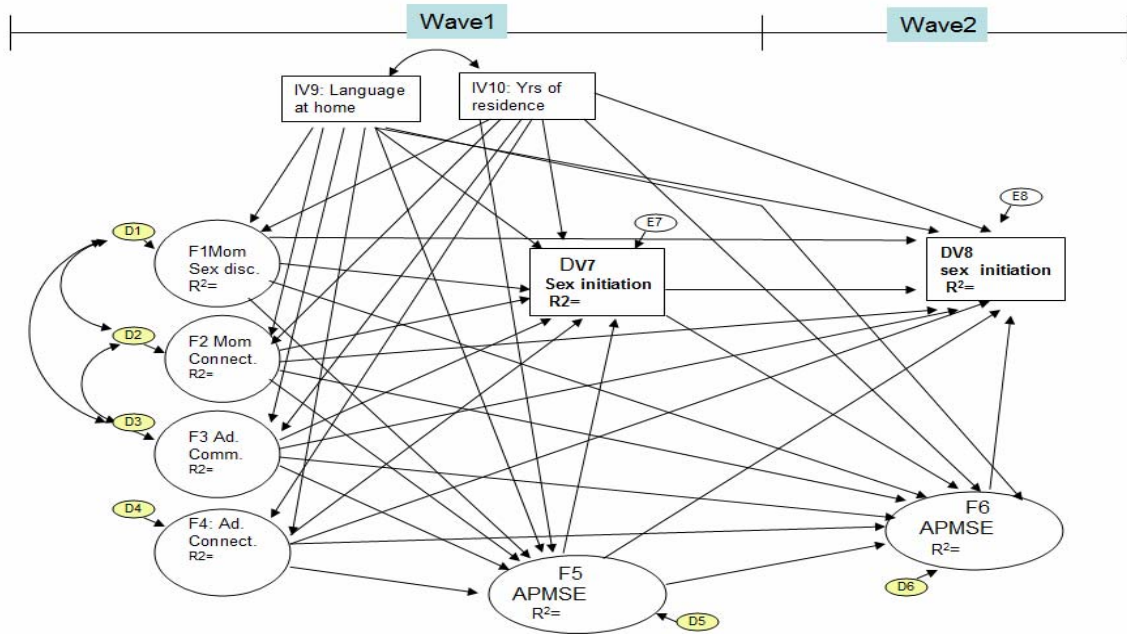


Figure 8: The Covariate Acculturation Model

Table 18: Descriptive Statistics of Observed Variables and Measurement Model

	Descriptive			Measurement model		
	N	Mean	SD	Factor Loading	SE	Error
F1: Maternal sexual discussion ($\alpha = .825$)	422	2.50	1.12	.883	1	.469*
V1: Extent of discussion: negative things						
V2: Extent of discussion: STIs	423	2.82	1.14	.851	.032 [†]	.525*
V3: Degrees of discussion: about sex	422	2.41	1.06	.776	.031 [†]	.631*
V4: Sexual discussion: difficult to explain	415	3.66	1.11	.452	.047 [†]	.892*
F2: Maternal perceived connectedness ($\alpha = .626$)	431	4.40	.70	.621	1	.784*
V5: Getting along well						
V6: Making decisions together	430	3.97	.99	.625	.127 [†]	.781*
V7: Can really trust adolescents	430	4.39	.87	.579	.117 [†]	.815*
F3: Adolescents' perceived general communication ($\alpha = .588$)						
V8: Talked about party you attended	415	.31	.46	.476	1	.879*
V9: Talked about personal problem	415	.29	.45	.485	.157 [†]	.874*
V10: Talked about school work or grade	415	.66	.48	.553	.168 [†]	.833*
V11: Talked about other things you do in school	415	.57	.50	.540	.166 [†]	.842*
F4: Adolescents' perceived connectedness ($\alpha = .851$)						
V12: How close do you feel to your mother	415	4.35	.89	.675	1	.737*
V13: Your mom is warm and loving toward you	415	4.27	.81	.712	.056 [†]	.702*
V14: Satisfied with the way of communication	415	3.86	1.06	.806	.056 [†]	.591*
V15: Satisfied with your relationship	415	4.20	.90	.898	.063 [†]	.440*
F5: APMSE at Wave 1 ($\alpha = .790$)						
V16: Your mom's feeling about having sex at this time of your life.	415	4.52	.75	.884	1	.467*
V17: Your mom's feeling about having sex with someone special.	415	4.18	.95	.829	.045 [†]	.559*
V18: Having sexual intercourse would upset your mom	411	4.29	1.04	.594	.044 [†]	.804*
F6: APMSE at Wave 2 ($\alpha = .799$)						
V19: Your mom's feeling about having sex at this time of your life.	401	4.34	.85	.896	1	.444*
V20: Your mom's feeling about having sex with someone special.	400	4.06	1.02	.749	.044 [†]	.663*
V21: Having sexual intercourse would upset your mom	399	4.20	.996	.660	.044 [†]	.751*
V22: Sexual initiation at W1 (1-7 scale)	433	1.88	1.64			
V23: Sexual initiation at W2 (1-8 scale)	433	2.16	1.89			

Fit indices for measurement model: S-B $\chi^2 = 300.29$ (df=179, N=433) $p = .000$; NFI=.931; NNFI=.966; CFI=.971; RMSEA=.040 (90% CI=.032-.047); * $p < .05$; ** $p < .01$; [†] $p < .001$

Data Analysis

The main reason for selecting structural equation modeling (SEM) as the analytic approach is its capacity to test the theoretical model simultaneously with all the constructs (McDonald, 2002), and to concurrently assess a number of exogenous and endogenous variables. Another important reason for selecting SEM is its recognition that observed variables are measured with error. That is, their reliabilities are known to be less than perfect. Hence, by using SEM, we can account for the imperfect measures by estimating the error terms. Interval- and categorical-level data with normal distribution patterns based on score ranges, means, standard deviations, skewness, and kurtosis were assessed with parametric statistics. Although the normalized Mardia for the AAPI base model was 17.277, which was lower than the problematic value of 30 (Newsom, 2005), with four categorical variables in the model, the robust statistics were selected and used instead of maximal likelihood statistics (Muthén & Kaplan, 1985). Consequently, Satorra-Bentler chi-square statistic ($S-B \chi^2$) was used as one of the indices. SPSS 14 for Windows was used to transfer data from the subset of data constructed using SAS 9.1. Internal consistency and reliability was assessed using the Cronbach's alpha coefficient (see Table 19). Table 19 also presents the means and standard deviations for the observed variables used in the measurement model.

Measurement model

EQS 6.1 for Windows (Bentler, 2006) was used for measurement and structural equation modeling. The model fit was assessed using robust estimation on the covariance

model including S-B χ^2 , NFI, NNFI, and CFI. One misfit index, RMSEA, also was used to assess model fit (Bentler, 2006; Raykov, Tomer, & Nesserlroade, 1991).

Table 19: The Measurement Model for Females and Males

Item/gender groups	Females (n=210)			Males (n=223)		
	FL	SE	Error	FL	SE	Error
F1: Maternal sexual discussion ($\alpha = .825$)						
V1: Extent of discussion: negative things	.915	1	.403*	.847	1	.532*
V2: Extent of discussion: STIs	.857	.042 [†]	.515*	.850	.048 [†]	.526*
V3: Degrees of discussion: about sex	.756	.043 [†]	.654*	.792	.047 [†]	.610*
V4: Sexual discussion: difficult to explain	.376	.069 [†]	.927*	.505	.065 [†]	.863*
F2: Maternal perceived Connectedness ($\alpha = .626$)						
V5: Getting along well	.492	1	.870	.684	1	.729*
V6: Making decisions together	.891	.321 [†]	.454*	.494	.135 [†]	.780*
V7: Can really trust adolescents	.479	.164 [†]	.878*	.597	.154 [†]	.802*
F3: Adolescents' perceived general communication ($\alpha = .588$)						
V8: Talked about party you attended	.517	1	.856	.449	1	.893*
V9: Talked about personal problem	.543	.203 [†]	.840	.390	.215 [†]	.921*
V10: Talked about school work or grade	.428	.186 [†]	.904	.642	.284 [†]	.766*
V11: Talked about other things you do in school	.441	.187 [†]	.898	.586	.261 [†]	.810*
F4: Adolescents' perceived connectedness ($\alpha=.851$)						
V12: How close do you feel to your mother	.702	1	.712*	.655	1	.756*
V13: Your mom is warm and loving toward you	.815	.07 [†]	.579*	.596	.088 [†]	.803*
V14: Satisfied with the way of communication	.819	.07 [†]	.574*	.783	.086 [†]	.621*
V15: Satisfied with your relationship	.891	.075 [†]	.454*	.905	.104 [†]	.425*
F5: APMSE at Wave 1 ($\alpha=.790$)						
V16: Your mom's feeling about having sex at this time of your life.	.912	1	.411*	.852	1	.524*
V17: Your mom's feeling about having sex with someone special	.801	.051 [†]	.599*	.859	.078 [†]	.511*
V18: Having sexual intercourse would upset your mom	.660	.055 [†]	.751*	.515	.068 [†]	.857*
F6: APMSE at Wave 2 ($\alpha=.799$)						
V19: Your mom's feeling about having sex at this time of your life.	.939	1	.344*	.831	1	.557*
V20: Your mom's feeling about having sex with someone special.	.746	.054 [†]	.665*	.767	.075 [†]	.642*
V21: Having sexual intercourse would upset your mom	.673	.055 [†]	.740*	.642	.070 [†]	.767*
Female measurement model fit indices: S-B χ^2 = 265.05, p=.000(df= 171, N=210); NFI=.899, NNFI=.952, CFI=.961, RMSEA=.051 (90% CI .039-.063)						
Male measurement model fit indices: S-B χ^2 = 185.05, p=.219 (df= 171, N=223); NFI=.910, NNFI=.991, CFI=.992, RMSEA=.019 (.000-.037)						

* p< .05; ** p<.01; [†]p<.001

For the gender comparison model, measurement model testing was performed separately on AAPI males and females. Table 19 provides the results of the measurement models, which showed that the model fit for the male model was better than that of female model. In general, these two measurement models were comparable. However, several variations were noted. For example, the factor loadings on maternal sexual discussion about “the negative things would happen” were higher for females than those for males. Moreover, mothers of AAPI adolescent males also reported more difficulty explaining sex than the mothers of female adolescents. From the measurement models, some variations also were noted in the way that AAPI adolescents perceived general communication with their mothers. For instance, AAPI adolescent females seemed more likely to talk with their mothers about personal problems and to feel their mothers’ warmth and loving attitudes more compared to AAPI adolescent males who, on the other hand, tended to talk with their mothers more about school work and things they did at school.

The fit indices for the acculturation measurement model were $X^2 = 313.12$ (df=171, N=433) $p=.000$; NFI=.931; NNFI=.966; CFI=.971; MSEA=.040 (90% CI=.032~.047), which indicated a good fit between the model and the data. Detailed information about the factor loadings of the base AAPI model is provided in Chapter II. With the fit index (i.e., NFI, NNFI, and RCFI) above the recommended .90 and the misfit index (i.e., RMSEA) below the suggested .06 (Raykov, Tomer, & Nesserlroade, 1991), it was assumed that the measurement model fit the data fairly well and the structural models could be examined.

Structural Model

The final sample of 433 AAPI adolescents and their mothers was included in the gender comparison and acculturation covariate models. All the analyses were performed using non-weighted data. The reasons for using non-weighted sample were discussed in Chapter II. Table 20 presents the descriptive statistics of the variables added in this study—adolescents’ language spoken at home, years of U.S. residence, and gender.

Table 20: Descriptive Statistics of Language Spoken at Home, Years of U.S. Residence, and Gender

	N	Minimum	Maximum	Mean	S.D.
Gender 1 = male, 0 = female	433	.00	1.00	.515	.500
Language spoken at home 1 = English, 0 = others	433	.00	1.00	.72	.45
Years in the U.S. if born in the U.S. (years in U.S.=age)	368	.67	17.92	12.51	5.30

In the structural model testing, the means of the standardized variables were used to form composite variables. The reason for using composites as a single indicator for latent factors was to decrease estimates of free parameters required for the structural model (Liang, Lawrence, Bennett, & Whitelaw, 1990). According to Bentler’s recommendation (1985), each free estimate would need 5–10 cases for SEM to converge. With two additional covariates in the acculturation model, the free parameters for estimate would be from 47 to 90 without composite variables; however, with composite variables, the free parameters for estimate only would be from 36 to 52. Hence, for the acculturation model to converge, a sample size of 450 to 900 would be required without composites, but with composites, it would only require 260 to 520 subjects. Since the available sample size of AAPI adolescents was 433, the acculturation model could only be examined using composite variables, which would be presented as a single indicator. In the gender comparison model, in order to perform group comparison using SEM, it

was necessary to split the AAPI sample ($n = 433$) into two subgroups (females and males). From the previous assessment with the AAPI base model, the free parameters for estimate was 36 with composites. Accordingly, with composites, a sample size of 180 to 360 cases in each subgroup would be needed for model testing. Because of the limited AAPI sample size after splitting these groups (female = 210, male = 223), using the composites as a single indicator for the latent factors would be beneficial for model convergence by minimizing estimates of free parameters (Liang, Lawrence, Bennett, & Whitelaw, 1990).

Gender comparison model

In the gender comparison model, the null hypothesis assumed that no differences existed between AAPI males and females in terms of maternal influences. Hence, initially, the equality of constraints was applied to the nested model in which all covariance of the exogenous variables and all paths of direction were specified to be equal. Then, the constraints were released one at a time to achieve the final plausible comparison model according to the assessment of model fit with the LaGrange Multiplier test (LM test). One of the constraints would be released if a significant drop in the Chi-square ($S-B X^2$; $p < .05$) was noted. In addition, the Yuan-Bentler Residual-based F-Statistic (Y-B F-test) was used to assess the level of significance when one of the constraints was released. Table 21 shows the sequences of constraints released to achieve the final plausible model for gender comparison. Ideally, a nonsignificant value ($p > .05$) of $S-B X^2$ and Y-B F-test is desirable when assessing goodness of model fit. Hence, an increasing p-value of $S-B X^2$ and Y-B F-test indicates improvement of the model fit. The fit and misfit indices were $S-B X^2 = 25.33$, 31df, $p = .753$ female $N = 210$, male $N = 223$;

NFI = .926; NNFI = 1.00; CFI = 1.00, RMSEA = .000 (90% CI: .000–.039) which indicated the gender comparison model fit the data fairly well and the final plausible model could be determined.

Table 21: Sequences of the Constraints Released of Gender Comparison Model

Group/Constraints		Nested Model (NM)	#1	#2
AAPI males and females	Path released	none	F1–F5	V7–V8
	S-B X^2 (df) p	36.576 (31) P = .226	29.75 (30) P = .478	23.73 (29) P = .742
	NFI	.893	.913	.930
	NNFI	.955	1.002	1.04
	RCFI	.980	1.000	1.000
	Y-B Residual F-test; df, F-statistics p value	.840 31df, 402 P = .715	.838 30, 403 P = .714	.772 29, 404 P = .798
	RMSEA	.029 (.000-.061)	.000 (.000-.051)	.000 (.000-.039)

Acculturation model

In the acculturation model (Figure 8), adolescents' language spoken at home and their length of residence in the U.S. were the two independent variables added to the base AAPI model. In this acculturation model, there were eight dependent variables because the four exogenous factors of the base AAPI model (i.e., mothers' perceived sexual discussion and connectedness and adolescents' perceived general communication and connectedness) were treated as endogenous variables to understand acculturation influences on the overall AAPI base model. That is, when the two acculturation variables were introduced the following questions were examined: what were their individual relationships with mother-adolescent interaction? How did the variables affect adolescents' perceptions of their maternal sexual expectation (APMSE)? And, how might these variables influence the onset of adolescents' sexual initiation over time?. The

reasons that these two variables were conceptualized as two independent covariates were that although there might be some correlations between adolescents' language spoken at home and their length of U.S. residence, these two variables also could reflect different aspects of acculturation. Hence, a decision was made to investigate the separate effects of these two covariates, rather than treating them as two indicators of a latent factor for acculturation.

Table 22: Pearson Correlations between Variables

	V9	V10	F1	F2	F3	F4	F5	F6	DV7
IV9: language spoken at home (1 = English, 0 = others)	1								
IV10: years of U.S. residence (if born in US= age)	.468**	1							
F1: Mom's perceived sexual discussion	.194**	.176**	1						
F2: Mom's perceived connectedness	-.114*	-.071	.004	1					
F3: Adolescent's general communication	.089	.032	.232**	.117*	1				
F4: Adolescent's perceived connectedness	-.084	-.052	-.039	.236**	.329**	1			
F5: APMSE at W1	-.038	.008	.021	.161**	-.027	-.001	1		
F6: APMSE at W2	-.104*	-.086	-.077	.188**	.003	.044	.599**	1	
DV7: Sexual initiation W1	.195**	.248**	.153**	-.209**	.141**	-.040	-.273**	-.308**	1
DV8: Sexual initiation W2	.186**	.202**	.184**	-.204**	.115*	-.077	-.147**	-.269**	.727**

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Similar to the gender comparison model, the acculturation covariate model used the composite variables as a single indicator. The reason for this approach was that, with the introduction of these two independent variables, an extra 16 free parameters were added

for estimate in the covariate model. Using a composite latent factor could decrease the free parameters required for performing the estimates. Table 22 presents the intercorrelations among all the variables used in the acculturation covariate model. Because the robust estimation was used to account for data's non-normal distribution, the Satorra-Bentler chi-square statistic (S-B χ^2) was used as one of indices. Generally, a nonsignificant chi-square (S-B χ^2) indicates the model fit. However, since S-B χ^2 is sensitive to the sample size, other indices such as NFI, NNFI, CFI, and RMSEA also were used to assess the model fit. The fit and misfit indices of the acculturation model were $\chi^2 = 102.41$, 51df, $p = .442$ $N = 433$; NFI = .963; NNFI = 1.063; CFI = 1.00; RMSEA = .000 (90% CI: .000–.075), which suggested the model fit the data fairly well and could be accepted as the final plausible acculturation model.

Results

Hypothesis 1: Gender differences

For the gender comparison model, we predicted gender differences in how AAPI mothers interacted with their adolescents and how adolescents may have perceived their maternal sexual expectation (APMSE), which consequently may have influenced their onset of sexual initiation. In particular, we expected the effects of maternal sexual discussion would be significantly different between AAPI adolescent males and females. In this comparison model, there were two significant differences noted from the results of this study (see Figure 9). First, through comparison, maternal sexual discussion had different effects on adolescents' perceived maternal sexual expectations (APMSE) for adolescent females and males. That is, maternal sexual discussion had positive and significant influences on the formation of APMSE at Wave 1 for AAPI adolescent males,

but not for the females. In fact, for AAPI adolescent females, maternal sexual discussion appeared to have small, negative effects (but not at a significant level) on APMSE at Wave 1, which concurrently showed a protective effect on for sexual initiation at Wave 2 for both genders. It was also expected that the effects of APMSE at Wave 1 on sexual initiation at Wave 2 would be significantly different between AAPI adolescent males and females. Although the protective effects of APMSE at Wave 1 on adolescents' sexual initiation at Wave 2 were slightly stronger for males (females and males: -.186 and -.229, respectively), the differences were not at a significant level. Hence, this hypothesis was not supported. Second, from this gender comparison model, we noted the relationship between adolescents' sexual initiation at Wave 1 (DV7) and Wave 2 (DV8) was different for AAPI adolescent females and males. It appeared that the associations between the timing of sexual debut on both waves were significantly stronger for AAPI adolescent females than for males. That is for AAPI adolescent females who were not sexually active at Wave 1 were more likely to remain so at Wave 2.

Besides these differences, one similarity in the mediation effect of maternal perceived connectedness between males and females was noted: maternal perceived connectedness consistently predicted a higher level of APMSE at Wave 1 and had indirect effects on delaying adolescent's sexual initiation at Wave 2. This mediation effect was at a significant level using the Sobel test (-2.389 , $p = .017$), in which APMSE at Wave 1 served as a mediator for the relationship between maternal perceived connectedness and adolescents' sexual initiation at Wave 2 for both genders. Moreover, there is no significant difference in the mediation effects of APMSE at Wave 1 for AAPI adolescent males and females.

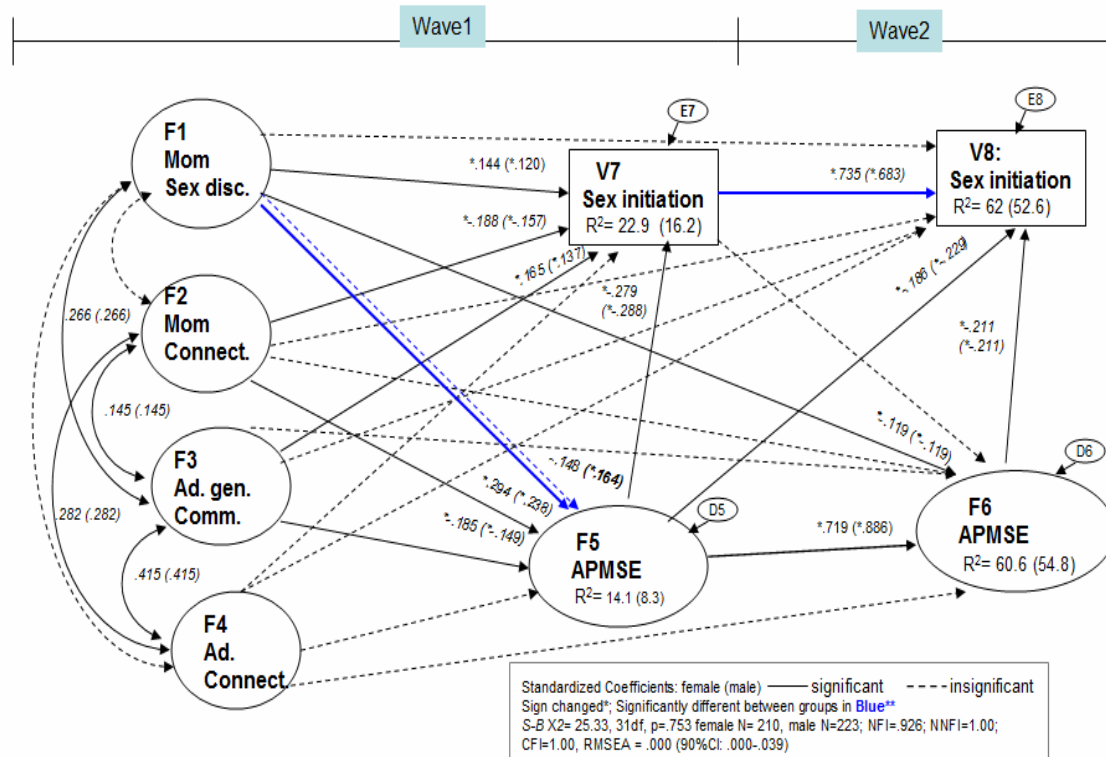


Figure 9: Gender Comparison Model

Hypothesis 2: Language spoken at home

In terms of assessing acculturation influences, the effects of adolescents' language spoken at home and their years of U.S. residence were tested separately. With regard to language spoken at home, it was first predicted that there would be a positive association between AAPI adolescents' speaking English at home and mother-adolescent interactions, such as mothers' perceptions of sexual discussion and connectedness and adolescents' perceived general communication and connectedness. That is, the relationships between perceptions of sexual discussion and connectedness and general communication the connectedness would be stronger for those adolescents reporting English spoken at home. This hypothesis was partially supported since the results of this acculturation model (see Figure 8) showed positive associations between these English language spoken at home and mothers' perceptions of interactions (i.e., sexual discussion

and connectedness) for these adolescents. English language spoken at home, however, was not associated with these adolescents' perceptions of their maternal interactions (i.e., general communication and connectedness).

Second, it was predicted that adolescents' speaking English at home would be positively associated with APMSE at Wave 1 and Wave 2, and would be negatively associated with sexual initiation at Wave 1 and Wave 2. This hypothesis was only partially supported. For instance, speaking English at home was associated with a higher level of APMSE at Wave 1, but not at Wave 2. Similarly, it also was associated with adolescents' later sexual initiation at Wave 1, but not at Wave 2.

Hypothesis 3: Length of U.S. residence

With regard to adolescents' length of U.S. residence, it was expected that adolescents' length of U.S. residence would be positively associated with 1) mother-adolescent interactions, 2) APMSE at Wave 1 and Wave 2, and 3) later sexual initiation at Wave 1 and Wave 2. These hypotheses were only partially supported in the acculturation model. The results (see Figure 10) showed that adolescents' years of U.S. residence only were significantly associated with adolescents' perceptions of general communication, but not with mothers' perceptions of their interactions (i.e., sexual discussion and connectedness) or adolescents' perceptions of connectedness. Although the length of U.S. residence was not associated with APMSE at Wave 1 or Wave 2, it had a protective effect against AAPI adolescents' early sexual initiation at Wave 2.

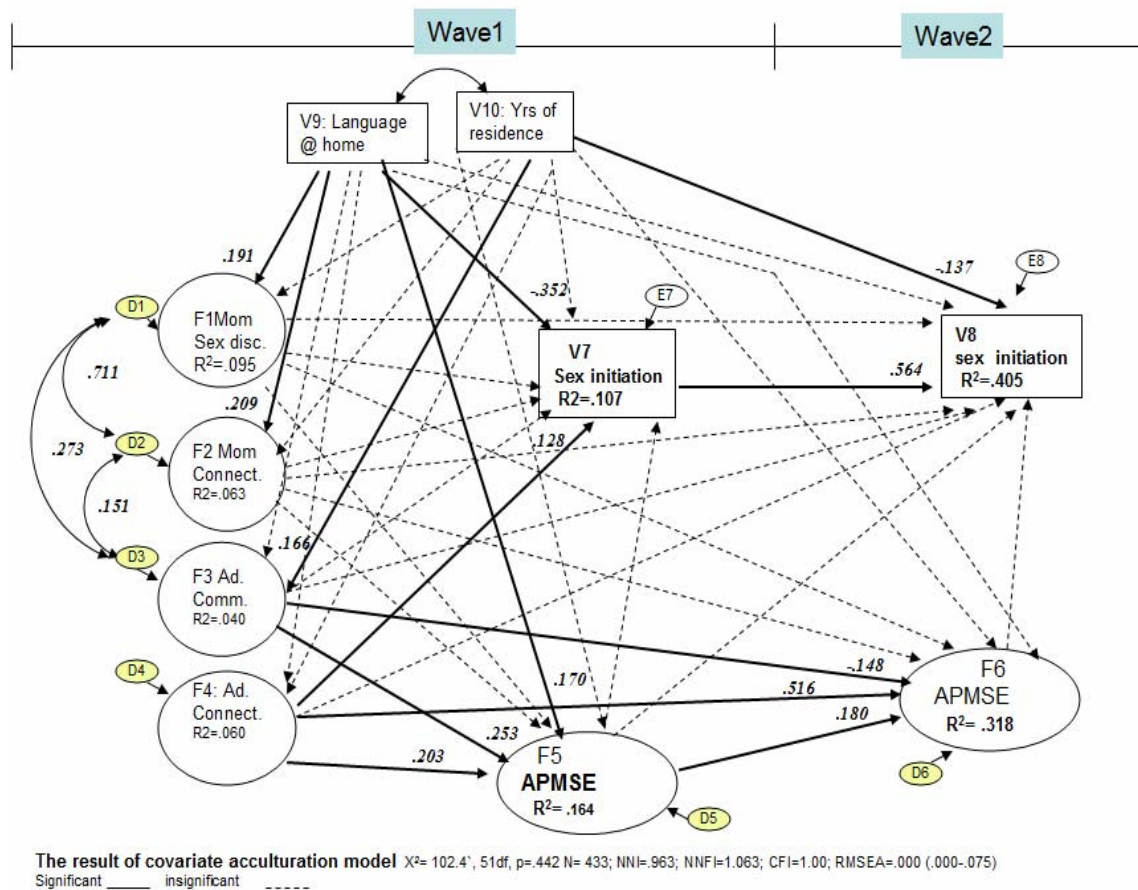


Figure 10: The Result of Covariate Acculturation Model

Discussion

The purpose of this study was to assess gender and acculturation influences on AAPI mother-adolescent interactions, APMSE, and adolescents' sexual initiation over time. Several important findings were derived from these two models. In the gender comparison model, consistent with our hypothesis, maternal sexual discussion had different influences on AAPI adolescent males' and females' perceived maternal sexual expectations (APMSE). Specifically, maternal sexual discussion was positively associated with APMSE for males but not for females. In the acculturation model, English spoken at home was more related to mothers' perceptions of interactions with their adolescents, adolescents' higher level of APMSE at Wave 1 and later sexual debut

at Wave 1, while adolescents' length of U.S. residence was more related to adolescents' perceptions of general communication with their mothers and later onset of sexual initiation at Wave 2.

Implications: Gender influences

The best-fitting plausible model of gender comparison indicated some differences in maternal influences between AAPI adolescent males and females. In particular, the relationship between mothers' perceptions of sexual discussion and adolescents' perceived maternal sexual expectations (APMSE) at Wave 1 was positive for AAPI adolescent males but negative for females. This difference might be the result of AAPI mothers' different sexual attitudes (or expectations) for their daughters and sons. For example, the contents of maternal discussion might be different for daughters and sons. It also is possible that AAPI mothers place more emphasis on the negative consequences of sexual activities when speaking with their daughters than with their sons which were verified in factor loading analysis (see Table 19). The mothers' focus on negative consequences might be rooted in fears for their girls' safety (Hall, 1996; Kao, 2007; Okazaki, 2002; Usita & Bois, 2005). It also is possible that AAPI mothers' sexual discussion with their daughters included gender- and culture-laden messages that were very restrictive (too much emphasis on the negative consequences) to be accepted by their acculturated AAPI daughters. Hence, the messages were not perceived as having reasonable sexual expectations by the daughters (Kao, 2007). Conversely, messages delivered to sons might be more subtle in nature (Downie & Coates, 1999; Kim & Ward, 2007; Moore & Rosenthal, 1991); therefore, those messages might be accepted by the sons as having reasonable expectations. Consequently, such discussions may be more

effective in shaping adolescent males' perceived maternal sexual expectations than those of females. Therefore, when promoting maternal sexual discussion, maternal sexual attitudes concerning their daughters and sons should be considered.

One surprising finding of this comparison model was that there were no gender differences in the influences of APMSE at Wave 1 on adolescents' sexual initiation at Wave 2. In fact, the effects were equivalent. This similarity suggests that although the formation of APMSE might be different between males and females, the protective effects of APMSE remained the same. That is, AAPI adolescent male and female sexual initiation is influenced similarly by the expectations they have perceived from their mothers. Hence, when developing strategies designed to increase APMSE, gender differences on how messages might be delivered or interpreted should be considered. Future research also should be expanded from the effects of mother-son communication to include the possible effects of father-daughter communication. Such investigation may account for the potential same gender bias existed between mother and daughter communication. Furthermore, interventions to improve maternal sexual discussion should not be limited to addressing discussions of the negative consequences of sexual intercourse. Instead, these discussions should be built around mothers' perceptions of connectedness (or trust). This is particularly important because maternal perceived connectedness has been consistently shown to be an important predictor for APMSE at Wave 1 and had indirect effects on delaying adolescent sexual initiation at Wave 2 in both of male and female models. The mediation effect was found to be significant using the Sobel test (-2.389, $p = .017$), in which APMSE at Wave 1 served as a mediator for the

relationship between maternal perceived connectedness and adolescents' sexual initiation at Wave 2.

In addition, this gender comparison model found a different relationship between sexual initiation at Wave 1 and Wave 2 for AAPI adolescent males and females. Specifically, the relationship between sexual initiation at Wave 1 and Wave 2 was stronger for adolescent females compared to males. That is, the magnitude of the relationship between of sexual initiation at Wave 1 and Wave 2 was higher for females than for males. In other words, for AAPI adolescent females who were not sexually active at Wave 1, they also were more likely to stay so at Wave 2. This finding suggests that AAPI adolescent females' sexual behavior at Wave 2 was more likely to be influenced by their sexual status at Wave 1 than that of males. Hence, early interventions to prevent early sexual initiation for AAPI adolescent females may be especially important.

Implications: Acculturation influences

In the acculturation model, the best-fitting plausible model suggested a different effect of acculturation when exploring separately the language spoken at home and the length of U.S. residence. Speaking English at home was significantly related to mothers' perceptions of sexual discussion and connectedness, APMSE at Wave 1, and adolescents' later sexual initiation at Wave 1. These associations suggest that if acculturation is measured by adolescents' self-identification of speaking English at home, then this kind of acculturation was protective against adolescents' early sexual initiation at Wave 1. Speaking English at home also predicted a higher level of maternal sexual discussion, perceived connectedness, and adolescents' higher level of perceived maternal sexual

expectation for AAPI adolescents. This result could be related to mothers' ability to understand English, which may play an important role in AAPI mother-adolescent interactions. It also is possible that, for those adolescents who spoke English at home, their mothers also were likely to be more acculturated (e.g., were born and/or educated in the U.S.); hence, these mothers may have been able to converse about sexual-related issues and to express their sexual expectations better than those mothers who were less acculturated (or accustomed). Consequently, the more acculturated AAPI mothers may be able to offer better support to offset the acculturation stress that is experienced by their AAPI adolescents. Hence, future studies should seek to explicate the influences of maternal acculturation in relation to acculturation stress of AAPI adolescents. Nursing practice should include strategies to incorporate maternal influences, considering mothers' level of acculturation.

When exploring the effect of adolescents' years of U.S. residence, positive associations with later onset of sexual initiation at Wave 2 and adolescents' higher perceptions of general communication were found. That is, the longer the adolescents lived in the U.S., the more likely they were to be able to have satisfactory general communication with their mothers and to delay sexual initiation at Wave 2. This finding suggests the positive effects of acculturation. It seems that the more acculturated AAPI adolescents were, the more likely they also were to delay their sexual initiation at Wave 2 compared to less acculturated adolescents. The protective effects might be the result of a lesser degree of acculturation stress (or pressure) experienced by acculturated AAPI adolescents. It is possible that the longer the adolescents lived in the U.S., the more accustomed they became to the majority culture; hence, their sexual behaviors were less

likely to be influenced by acculturation stress (e.g., peer pressure). Nevertheless, it is interesting to note that the length of residence was not related to mothers' perceptions of sexual discussion and connectedness. This finding suggests that if acculturation was measured by the length of U.S. residence, it did not predict a higher level of maternal sexual discussion or perceived connectedness. In other words, the mothers' prolonged residence in the United States, did not predict the mothers' closeness to their adolescents or the likelihood of them speaking with their adolescents about sex. This finding suggested that other factors (e.g., their abilities to understand English) associated with AAPI mothers' acculturation may play an important role on promoting maternal sexual discussion and connectedness.

Although both attributes of acculturation predicted later sexual initiation for AAPI adolescents (either at Wave 1 or Wave 2), English spoken at home was related to mothers' perceptions of interactions, whereas the length of U.S. residence was related to adolescents' perception of interactions. This difference in correlations suggests that English spoken at home may have other socio-economic components that are linked to acculturation. Hence, further research should investigate other acculturation factors associated with AAPI maternal influences on adolescents' sexual behavior. In addition, a positive association was noted between AAPI adolescents' perceived connectedness and APMSE at both waves. That is, when acculturation factors are considered, those adolescents who had close relationship with their mother also reported having a higher level of APMSE at both waves. In other words, for more acculturated AAPI adolescents, their perceived connectedness was an important indicator for a higher level of APMSE at both waves. Although the sample was not large enough to have significant results on the

pathway between APMSE at Wave 1 and the onset of sexual initiation at Wave 2, this positive relationship does provide support to promote adolescents' perceived connectedness in order to increase APMSE, in which protective effects have been shown in the both base and gender models (see Chapters II and III).

Taken together, for the adolescents who demonstrated higher levels of acculturation (i.e., measured by English spoken at home or by length of U.S. residence), the onset of sexual initiation was likely to be later. This finding also suggests that acculturation is protective against AAPI adolescents' early sexual initiation. In other words, it also is possible that less acculturated AAPI adolescents may have experienced greater acculturation stress (e.g., peer pressure) and this may consequently have contributed to an earlier onset of sexual initiation. Therefore, nursing interventions should consider acculturation stress in adolescents' sexual behavior, particularly for AAPI adolescents who have recently arrived in the U.S. It is likely that in order to delay sexual initiation of new immigrants, strategies should be aimed at augmenting their maternal influences by improving mother-adolescent's relationship, which may help to alleviate adolescents' acculturation stress. Research to further explicate the relationships between AAPI maternal influences and adolescents' acculturation stress is warranted.

Limitations

Although the findings of this study were valuable in understanding gender and acculturation influences on AAPI adolescents' sexual initiation, several limitations of this research are noted. First, since this was a secondary data analysis, the measurements were not originally designed for this study. Therefore, some of measurements (such as APMSE) might not be perfect. It would be important for future study to verify some of

the constructs that were shown in this study to be significant. Second, although the sample size of the AAPI adolescents used in the gender and acculturation models was enough for the model to converge, some pathways might be insignificant because of the small power resulting from the limited sample size and the complex model. It would be important for future studies to use this with a larger sample of AAPI adolescents or other groups. Third, although in order to have a large enough sample for model testing, the AAPI group was treated as a subgroup in this analysis, one should not assume that the AAPI population is a homogenous group. Instead, the AAPI group is heterogeneous, and consists of many different and unique cultures. Hence, these results should not be generalized to any other particular groups of AAPIs. Fourth, because this study focused only on maternal influences, it would be helpful in the future to investigate paternal influences on AAPI adolescents' sexual behaviors, particularly paternal sexual discussions with AAPI adolescent girls. Fifth, because of the way the length of U.S. residence was calculated for AAPI adolescents, the length of family residence in the U. S. was not measured. Hence, the different degree of acculturation created by different level of family acculturation may not be accounted in this variable, particularly for adolescents who were born in much later generations (e.g., 3rd or 4th generation) of AAPI families. Future study should account for acculturation influences that might be different among generations.

Conclusion

Although only some of the hypotheses were supported by the gender comparison and acculturation models, some important findings were noted from these explorations. First, while as a whole there is no evidence to support that AAPI maternal sexual

discussion was protective against adolescents' sexual initiation at Wave 2, there is an indirect protective effect mediated through APMSE at Wave 1 for AAPI adolescent males. Although the indirect effect was not at the statistically significant level of .05 when using Sobel test to evaluate for the mediation effects ($p=.098$), it is important to note that this indirect protective effect was totally absent in females. In other words, AAPI maternal sexual discussions had a positive influence on AAPI adolescent males in terms of increasing APMSE at Wave 1 and for indirectly delaying adolescents' sexual initiation at Wave 2; no such influence, however, was found for these AAPI adolescent females. It is possible that the different effects of maternal sexual discussion may result from different sexual expectations for their sons and daughters of these AAPI mothers. Hence, an effective maternal sexual discussion may still have the potential to increase APMSE and delaying sexual initiation for AAPI adolescent females. However, further research is needed to investigate such difference and its potential effects for females.

Second, unlike the proposed hypothesis that the effects of APMSE would be different between the genders, our finding showed a similar effect of APMSE between AAPI adolescent males and females. That is, although the formation of APMSE was different between the genders, the effects of APMSE on sexual initiation at Wave 2 were similar for AAPI adolescent males and females. This finding suggested that although APMSE may prevent AAPI adolescent males and females from engaging to a similar extent in early sexual initiation, the way APMSE was shaped from maternal sexual discussion was different. Hence, when nursing interventions are designed to promote maternal sexual discussion among AAPI adolescents, nurses should pay attention to potential gender differences between AAPI adolescent males and females. It is possible

that AAPI adolescent females experience more conflicts with their gender role in addition to culturally-specific Asian and American sexual expectations. It also is possible that AAPI mothers might place too much emphasis on discussing the negative consequences of sexual activities that might backfire in its effectiveness. One consistent and important finding of this gender comparison model was the positive association between mothers' perceived connectedness and APMSE for both genders. The results showed that promoting adolescent perceived maternal sexual expectations (APMSE) might be better accomplished by encouraging AAPI mothers to establish a trusting and supportive relationship with their adolescents, because this relationship is fundamental for adolescents to perceive a lucid maternal sexual expectation.

In the acculturation model, the influences of English spoken at home and length of U.S. residence were different in some aspects. First, English spoken at home was positively associated with mothers' perceptions of their adolescent interactions, while the length of U.S. residence was associated with the adolescents' perceptions of maternal interactions. This difference suggests that mothers' ability to understand English is essential for AAPI mothers when discussing sex-related issues or feeling connected to their adolescents. Hence, it is important to promote a common language (e.g., English) between AAPI mothers and adolescents. Second, the relationships of these two attributes with the onset of sexual initiation were different as well. For instance, English spoken at home was associated with later sexual initiation at Wave 1, while the length of residence was associated with later sexual initiation at Wave 2. The difference signified the predictive value of the length of U.S. residence. That is, the longer the adolescent had resided in the U.S., the more likely that the AAPI adolescents' sexual initiation at Wave 2

would be at a later time. In sum, these findings on acculturation contradict the commonly-held belief that more acculturated AAPI adolescents would behave more like the white adolescents (Okazaki, 2002) whose sexual initiation often was found to be earlier than those of AAPI adolescents (average age of 16.5 and 18.1, for whites and AAPIs, respectively) (Upchurch, Levy-Storms, Sucoff, & Aneshensel, 1998). It should be noted that the above comparison was from a between-group evaluation, which is independent from acculturation considerations. The differences in these findings demonstrate a need to consider acculturation stress for the newly immigrated AAPI adolescents. It also is possible that after prolonged residence in the U.S., acculturated AAPI adolescents may behave more like with white adolescents, compared to the adolescents in Asian countries. However, for the newly immigrated AAPI adolescents, their risk of having early sexual intercourse may be related to acculturation factors, such as acculturation stress, peer pressure, or the lack of proper supports from their parents. Hence, future research with AAPI adolescents should include a focus on acculturation factors. Nursing interventions should consider acculturation influences particularly for newly immigrant AAPI families and adolescents.

Although there is limited understanding about the effects of AAPI mothers' acculturation, by exploring the influences of these two covariates, we learned a bit more about AAPI maternal influences when considering these specific acculturation factors. However, more research is needed to better understand the acculturation influences of AAPI mothers on their adolescents' sexual behavior. Future studies should include other sexual behaviors (e.g., condom use) in the investigation. Knowledge gained from such

inquiries would help to ensure the success of nursing intervention programs seeking to delay early sexual initiation.

CHAPTER V

Discussion and Conclusion

Introduction

Purpose

The purpose of this secondary data analysis was to explore maternal influences on Asian American Pacific Islanders (AAPI) adolescents' sexual initiation over two time points (Wave 1 and Wave 2). Additional objectives were to understand the potential differences related to cultural, gender, and acculturation factors. Maternal influences were evaluated by the interactions between mother and adolescent (i.e., maternal perceived sexual discussion and connectedness; adolescents' perceived general communication and connectedness) and adolescents' perceived maternal sexual expectations (APMSE). Structural equation modeling (SEM) was used to simultaneously test the relationships among the specified exogenous and endogenous variables. EQS 6.1 for Windows was used for model testing (Bentler, 2006).

The focal population of this secondary analysis was AAPI adolescents and their mothers. Nevertheless, to assess possible cross-cultural differences, adolescents and mothers from three racial and ethnic groups: African Americans (AA), Hispanic Americans (HA), and whites, were used for comparison. In addition, to assess potential gender differences between AAPI adolescent males and females, a gender comparison model was examined. The influences of acculturation on AAPI adolescents' sexual

initiation also were examined using two covariates, adolescents' language spoken at home and their length of residence in the United States.

Specific Aims

The four specific aims of this secondary data analysis were: 1) to explore AAPI mothers' and adolescents' perceptions of their interactions with each other and these relationships with adolescents' sexual initiation over time; 2) to compare potential differences in maternal influences between the AAPI adolescents and three other racial and ethnic groups— African Americans, Hispanic Americans, and whites; 3) to explore influences of acculturation, specifically adolescents' length of U.S. residence and language spoken at home on the mothers' and adolescents' perceptions of interactions with each other and AAPI adolescents' sexual initiation; and 4) to explore gender variations in the relationship between mother-adolescent perceptions of interactions and sexual initiation over two time points among AAPI adolescents. The purpose of this study was to understand maternal influences on AAPI adolescents' sexual initiation and at the same time to evaluate other possible factors that might affect maternal influences in this understudied population.

Several important findings derived from this secondary analysis are helpful in understanding AAPI adolescents' sexual behavior. However, since some of the results obtained contradicted common beliefs or previous research results, further appraisals of this study in relation to methodology, results, limitations, and implications are examined and discussed.

Methodology

The methodology used in this study was appropriate for the purposes of the study. The study's design was a secondary analysis of a national representative longitudinal data set (Add Health) (Udry, 1998), which has a sufficient sample of AAPI adolescents for this multivariate analysis. The theoretical framework used as an underpinning for this study investigating sexual behavior in adolescents was Bronfenbrenner's Social Ecological Model (Wilson, 2003) which incorporates contextual influences. A preliminary qualitative study (Kao, 2007) was conducted with Taiwanese American mother-daughter dyads to ensure the suitability of constructs used in the model testing. Several latent factors were used in SEM to test interrelationships among maternal perceived sexual discussion and maternal connectedness; adolescents' perceived general communication and adolescent's connectedness; and adolescents' perceived maternal sexual expectation (APMSE). Validity and reliability of the measures were evaluated using confirmatory factor analysis, and Cronbach's alpha. Multiple SEM models also were examined to assess the relationships between maternal influences and other associated factors, such as race and ethnicity, gender, and the level of acculturation. Although the methodology used fit the purposes of this study, it is important to note the possible limitations associated with a secondary data analysis. For example, the items used in the study were not originally designed for the current study; there were restrictions on which items were available to measure constructs. Thus, it is possible that some constructs tested in the model were measured less than perfectly. Although cautions were taken to avoid a forced-fit situation, it is still important to note that many measurements for the studied constructs were not perfect. As a result, it would be

important for future research studies to seek to verify these findings. It would be meaningful to develop a psychometrically sound instrument to measure the constructs that are fairly new, such as adolescents' perceived maternal sexual expectations (APMSE).

Missing data were handled with the Pair algorithm that is available in EQS 6.1 for Windows (Bentler, 2006). Listwise deletion was not used because it can render a longitudinal study with few cases left, resulting in grossly ineffective estimates (Brown, 1994). This was especially important in this study, since the focal population (AAPIs) was the smallest group of subjects. Another reason for using pairwise algorithm rather than maxima likelihood algorithm (ML) was because of the pairwise algorithm's compatibility with robust statistics (ML, Robust). "That is, ML estimators based on the pairwise covariances are obtained, and the resulting statistics are subsequently corrected in the conceptual way described by Satorra and Bentler (1994) using the van Praag et al. theory" (Bentler, 2006, p. 6). The robust statistic was preferred mainly due to the data's departure from normal distribution, particularly with Hispanic American (HA) and white groups. For example, the Mardia normalized estimates were 46.59 and 80.1, respectively, for HAs and whites, which exceeded the recommended value of 30 (West, Finch, & Curran, 1995). Hence, for the purpose of consistency, all model testing was conducted using the pairwise algorithm along with robust statistics (ML, Robust).

Another methodological issue was the decision to use nonweighted data in the analysis. This decision was based on the multiple evaluations of using weighted and nonweighted data. Although there is a consensus on using weighted data in generalized descriptive statistics for subpopulations, there is no consensus when conducting in

multivariate analyses (Gelman, 2006). The decision to use nonweighted data mainly was due to the small proportion (about 3%) of our focal group (AAPIs). If the weights had been adjusted for the over-sampled AAPIs (e.g., the no response rate), this would not necessarily have produced nonbiased inferences. In addition, since ethnic and gender differences were included in our model testing, using nonweighted data was probably preferable because the nonweighted estimates were unbiased, consistent, and had much smaller standard errors than the weighted estimates (Winship & Radbill, 1994). Given the above considerations, using nonweighted data for the analyses was justified.

Discussion

The results discussed are given in the sequence of the specific aims and by the effects of exogenous variables examined by our models. The proposed hypotheses also are discussed. Possible implications of significant findings as well as potential explanations for unsupported hypothesis are explored.

Specific Aims

Specific Aim #1: To explore the relationships between maternal influences and AAPI adolescents' sexual initiation over time.

When exploring the relationships between maternal influences and AAPI adolescents' sexual initiation, several hypotheses were supported. For example, adolescents' level of perceived maternal sexual expectations (APMSE) at Wave 1 successfully predicted later sexual initiation at Wave 1 and at Wave 2. This finding provides evidence to support the positive influences of APMSE for AAPI adolescents. However, in terms of the formation of APMSE, only mothers' perceived connectedness

had a positive association with APMSE at Wave 1. On the other hand, adolescents' perceived general communication and connectedness did not demonstrate a significant relationship with the formation of APMSE at either Wave 1 or at Wave 2.

Surprisingly, there was a negative association between maternal perceived sexual discussion and APMSE at Wave 2. That is, having a higher level of maternal sexual discussion predicted a lower APMSE at Wave 2. Similarly, maternal sexual discussion predicted earlier sexual initiation at Wave 1. These negative associations seemed to echo the results found by Widmer (1997) that maternal sexual discussion was related to adolescents' earlier sexual initiation. The finding from the AAPI model also suggests that when maternal sexual discussion primarily focuses on the negative consequences of sexual activities, it may not be effective in delaying AAPI adolescents' sexual initiation or for increasing APMSE. This finding warrants a closer examination on what is involved in the sexual discussion. It is possible that the effects of sexual discussion rely on the contents of sexual discussion. A possible implication to delay AAPI adolescents' sexual initiation may be to restructure the contents of maternal sexual discussion to focus on maternal support, connectedness, expectations, and values.

This approach is important because while maternal sexual discussion was associated with early sexual initiation, AAPI maternal perceived connectedness with their adolescents significantly predicted later sexual initiation at Wave 1 and a higher level of APMSE at Wave 1. This finding suggests that maternal influences on AAPI adolescents' sexual initiation did not necessarily rely on sexual discussion alone; in fact, this model suggests that AAPI adolescents' perceived maternal sexual expectations (APMSE) were mostly influenced by the mothers' perceived connectedness with their adolescents.

Specific Aim #2: To compare the potential differences in maternal influences between AAPI and three other racial and ethnic groups, specifically African Americans, Hispanic Americans, and whites.

When comparing maternal influences between AAPI adolescents and the three other racial and ethnic groups, one consistent difference was noted. The across-waves effects of APMSE at Wave 1 on adolescents' sexual initiation at Wave 2 only were significant for the AAPI adolescents. For the other racial/ethnic groups, the effects of APMSE were limited to the same wave. That is, a higher level of APMSE was related to later sexual initiation during the same wave for AA, HA, and white adolescents. The different effects of APMSE between the AAPI and other racial and ethnic groups may be related to their respective cultures placing a different emphasis on collective family values. It is possible that these AAPI adolescents received more protection from APMSE than did the other racial and ethnic groups because of these different cultural perspectives. Thus, although promoting APMSE might be effective for all adolescents, the degree of protection it confers may differ by cultural group.

One consistent negative finding across all these groups of adolescents was the association between maternal sexual discussion and early sexual initiation at both waves. It seemed that the mothers' perceptions of sexual discussion (talking about negative consequences of sex, STIs, in-depth discussions about sex, and mothers' confidence in their ability to provide explanations of sex) did not delay adolescents' sexual initiation over time or increase adolescents' perceived maternal sexual expectations (APMSE). In contrast, maternal perceived connectedness emerged as an important predictor and protector of adolescents' early sexual initiation; particularly for AAPI and HA

adolescents. In fact, AAPI and HA mothers' perceived connectedness significantly predicted a later sexual initiation at Wave 2 for their adolescents. This finding signifies the importance of promoting AAPI and HA mothers' perceived connectedness with their adolescents, particularly when these mothers were more likely to be new U.S. immigrants. Therefore, establishing a trusting relationship between a mother and her adolescent could be important for promoting AAPI and HA adolescents' sexual health. However, because of the increasing complexity in their own adaptation to American society, special intervention strategies may need to be developed to help these mothers overcome challenges to acculturation and to foster connection with their adolescents.

Another subtle difference found for the HA group was the lack of a negative association between adolescents' general communication with their mothers and early sexual initiation. It appeared that, different from adolescents of the other racial and ethnic groups, HA adolescents were the only group that did not mistake their general communication with their mothers as signifying a permissive attitude toward teenage sexual intercourse. Hence, promoting general communication between HA mothers and adolescents may be an effective way to promote APMSE and to delay their sexual initiation, compared to adolescents from the other groups. Similarly, although adolescents' general communication with their mothers predicted earlier sexual initiation for these AA adolescents, it is important to note that AA adolescents' perceived general communication was related to a higher level of APMSE at Wave 2 which was related to a later sexual initiation at Wave 2. The variation in the findings provide evidence to support that cultural distinctions among these racial/ethnic groups exist with regard to

maternal influences; thus, nursing care should be culturally appropriate when promoting adolescents' sexual health.

Specific Aim #3: To explore acculturation influences (e.g., the length of U.S. residence and the language spoken at home) on the relationship between maternal influences and adolescents' sexual initiation among AAPI adolescents.

When exploring the influences of acculturation on the AAPI model, different effects were noted for the two covariates. For example, although there was a positive association for these two acculturation attributes with later sexual initiation, their associations within each wave were different. For example, adolescents' reports of English spoken at home predicted later sexual initiation at Wave 1 but not at Wave 2. On the other hand, the adolescents' length of U.S. residency only predicted later sexual initiation at Wave 2. This across-waves predictive value denoted the value of acculturation (the length of U.S. residency) on AAPI adolescents' sexual behavior.

Although adolescents' speaking English at home did not significantly predict later sexual initiation at Wave 2, this attribute did predict later sexual initiation at Wave 1, and also had a positive relationship with mothers' perceptions of sexual discussion and connectedness and adolescents' perceived maternal sexual expectations (APMSE) at Wave 1. The findings suggest that for AAPI adolescents, a large part of maternal influences depends on the means of English language speaking with their mothers. It is possible that for those mothers who are able to understand English, their ability to connect with American society might be greater than those mothers who had limited English language skills. Hence, these mothers may have had a better relationship with their adolescents and might have been better prepared to engage in discussions with their adolescents, thus

also having better perceived connectedness with their adolescents. As a consequence, their adolescents also may have been able to perceive a higher level of maternal sexual expectations (APMSE).

Although, in the acculturation model, a significant relationship between APMSE at Wave 1 and adolescents' sexual initiation at Wave 2 was not found, a significant and positive relationship was verified in the AAPI base and gender comparison models. Therefore, a conclusion can be made that promoting a common language (e.g., English language speaking) between AAPI mothers and adolescents may be advantage to increasing mothers' perceptions of interaction with their adolescents and APMSE which may indirectly delay adolescents' sexual initiation.

Another significant relationship between adolescents' perceived connectedness and APMSE both at Waves 1 and 2 was noted from the acculturation model. It seems that when these two covariates were added into the SEM, AAPI adolescents' perceived connectedness predicted a higher level APMSE at both Waves 1 and 2. This finding is unique because this relationship was not significant for AAPI adolescents in the base, gender comparison, or racial/ethnic group comparison models. It appears that when the acculturation variables were considered, AAPI adolescents' perceived connectedness was highly correlated with APMSE at both Waves 1 and 2. Although in the acculturation model, a significant relationship between APMSE at Wave 1 and sexual initiation at Wave 2 was not established, it is important to note that the acculturation model was much more complicated than the base, race/ethnic comparison, and gender models. Hence, the lack of significance might be the result of the small AAPI sample size. Given the significant relationship between APMSE and later sexual initiation for the AAPI base model, gender

comparison, and racial/ethnic group comparison models, it may be indirectly concluded that when acculturation influences are considered, AAPI adolescents' perceived connectedness was related to a higher level of APMSE, which may be related to adolescents' later sexual initiation over time. We could further speculate that AAPI adolescents' degree of acculturation might play an important role on how these adolescents perceive their mothers' sexual expectations. It seemed that, for more acculturated AAPI adolescents, their perceived connectedness with their mothers is influential on the formation of APMSE as compared to those of less acculturated adolescents. Since the same relationship was seen in AA and white adolescents, we could contemplate that as the level of acculturation increased for AAPI adolescents, the pattern of how APMSE was formed for AAPI adolescents is similar to AA and white adolescents. Therefore, although the effects of APMSE on delaying sexual initiation were imperative for AAPI adolescents, the formation of APMSE might be altered as their level of acculturation changes. Hence, interventions to promote AAPI adolescents' perceived maternal sexual expectations (APMSE) should consider adolescents' different levels of acculturation.

Specific Aim #4: To explore gender variations in the relationship between maternal influences and sexual initiation among AAPI adolescents.

When examining the gender comparison model, for the most part, the maternal influences for these AAPI adolescent males and females were similar. Generally, APMSE at Wave 1 had similar effects on delaying adolescent's sexual initiation at Wave 2 for both genders. Although this finding did not support the proposed relationship (i.e., a different effect by gender), the comparable and positive relationship between APMSE

at Wave 1 and sexual initiation at Wave 2 for both genders is noteworthy; in particular, this finding verified the importance of promoting AAPI adolescents' perceived maternal sexual expectations, which was also consistent with the results from the other tested models.

One hypothesis supported by this gender comparison model was the different effects of maternal sexual discussion on the formation of APMSE for adolescent males and females. We found the effects of maternal sexual discussion were positive for AAPI adolescent males but negative for the females. It seems that AAPI adolescent males were able to perceive their mothers' sexual discussion as a positive influence to form a higher level of APMSE. This positive influence, however, was absent for AAPI adolescent females. This gender difference might be related to AAPI mothers' different ways of conducting sexual discussion with their adolescent males and females. It is possible that AAPI mothers might focus more on negative consequences of sex when discussing sex related issues with their adolescent females. This tendency was observed at measurement model, in which, the factor loading on discussing negative consequences of sex was much higher for females compared to males (.915, .845, respectively). Consequently, one could speculate the different relationship between maternal sexual discussion and APMSE for AAPI adolescent males and females might be related to the content of sexual discussion delivered by the mothers. It is also possibly that the difference is related to AAPI mothers' different attitude toward AAPI adolescent males and females.

This finding suggests that, for AAPI adolescents, gender is an important variable that can determine the effects of maternal sexual discussion. This variation is particularly important since an equally positive relationship between APMSE at Wave 1 and later

sexual initiation at Wave 2 existed for both genders. These findings suggest that when promoting maternal sexual discussion, a different approach may need to be used when targeting AAPI adolescent males and females. Furthermore, to improve the effects of maternal sexual discussion, future research needs to focus on the possible causes of this gender variation for AAPIs and other potential gender differences that may exist for other racial and ethnic groups.

Amount of Variance Explained

In general, the amount of variance explained by the tested models was at a satisfactory level (see Table 23). The dependent variables at Wave 2 (APMSE and sexual initiation) explained about 54% to 62% of the variance, except for the acculturation model, in which 31.8% and 40.5%, respectively, of the variance in APMSE and sexual initiation was explained by the model. For the dependent variables at Wave 1, APMSE explained about 1.6% to 4.6% of the variance, except for the acculturation and gender model, where 8.3% to 16.4% of the variance in APMSE and sexual initiation was explained. Moreover, adolescents' sexual initiation at Wave 1 explained about 15% to 20% of the variance in APMSE and sexual initiation in most models except for the acculturation model, where about 10.7% of the variance was explained by sexual initiation at Wave 1. On the whole, the variance explained by APMSE at Wave 1 was much higher in the acculturation and the gender models than in the other models. Conversely, at Wave 2, the variances explained by APMSE were not maintained in the acculturation model. In fact, the variance explain by APMSE at Wave 2 was the lowest (only 31.8%) in the acculturation model compared to the other models, where approximately 55%–62% of the variance was explained APMSE at Wave 2.

The different amount of variance explained suggests that APMSE at Wave 1 was better explained when adolescents' levels of acculturation and/or gender were considered. In terms of explaining adolescents' sexual initiation, the AAPI base model, the racial and ethnic group comparisons, and the AAPI gender models performed better than the acculturation model. It is important to note that these differences might have resulted from the increased complexity of the acculturation model. In sum, the most promising model to explain AAPI adolescents' sexual initiation at Wave 2 was the AAPI gender comparison model.

Table 23: Percentage of the Variance Explained (R^2) by Each Model

Models\ R^2 for each Dependent Variable		F5: APMSE at Wave 1	F6: APMSE at Wave 2	DV7: Sexual Initiation at Wave 1	DV8: Sexual Initiation at Wave 2
AAPI Base Model		4.6%	58.8%	17.7%	56.1%
Ethnic Group Comparison Models	AAPI (AA)	1.6% (1.6%)	60.1% (56.9%)	20.4% (12.0%)	56.6% (44.6%)
	AAPI (HA)	2.4% (2.6%)	59.6% (56.0%)	20.5% (15.4%)	54.0% (50.9%)
	AAPI (white)	2.5% (2.2%)	62.4% (57.7%)	20.4% (17.9%)	54.7% (53.2%)
AAPI Acculturation Model		16.4%	31.8%	10.7%	40.5%
AAPI Gender Comparison Model	Female (Male)	14.1 (8.3%)	60.6% (54.8%)	22.9% (16.2%)	62% (54.8%)

The Relational Perspectives

In this section, the effects of the exogenous variables on the endogenous variables from all models is evaluated, discussed, and summarized. The results are compared with the research literature for consistency and differences are discussed. The discussion explored here is to synchronize the meaning of each exogenous variable from the tested models and to further understand the significance and implications derived from the model testing. Limitations and implications of the study also are discussed.

Cultural Perspective

Parent-child relationship

Different aspects of parent-child relationships have been investigated by developmental, parenting, and family researchers (Baumrind, Cowan, & Hetherington, 1991; Chao, 2001; Kim & Choi, 1994; Kirbria, 1993; Phinney & Chavira, 1995). Among them, studies of parenting styles guided by western perspectives have found that the authoritative style (high demandingness and high responsiveness) was the most functional parenting style compared to others, including the authoritarian (high demandingness but low responsiveness), permissive (low demandingness but high responsiveness), and indifferent (low demandingness and low responsiveness) styles (Baumrind, Cowan, & Hetherington, 1991). This parenting framework, however, was not supported by studies examining academic achievement of AAPI adolescents, where the authoritarian parenting style was found to be associated with higher educational achievement (Chao, 2001; Huntsinger, Jose, & Larson, 1998). This variation in findings might be related to cultural differences in family or educational values between Western and Eastern perspectives. It is possible that, from the viewpoint of Eastern cultures, family and educational values are expressed by the parents' physical involvement in their teenagers' daily activities (e.g., through closer parental monitoring or control), rather than by the expressive involvements (e.g., verbal communications) more typical of Western parenting styles. Hence, adolescents from Eastern cultures may report that their parents have a higher level of demandingness (expectations) and a lower level of responsiveness (warmth), compared to what they have observed or perceived of Western-style parenting.

Since parental love may be expressed (or interpreted) differently in different cultures, it is important to consider maternal influences from these different cultural perspectives.

In Eastern cultures, which are influenced by Confucianism, children are expected to respect their parents regardless of their parents' parenting styles. It is possible that AAPI parents may want to maintain their respectful images project respectful persona by maintaining a certain distances with their children. As a result, AAPI parents' responsiveness (a distant reaction such as a smile or a nod) may differ from that of white parents (a warm reaction such as a verbal expression of concern, a hug, or a kiss). Similarly, the concept of demandingness in Asian families can be very complicated when seen from Asian perspectives. For instance, an important part of the parent-child relationship among Asian cultures is to extend their family line, including carrying on family names, honors, and values. For this reason, because of their traditional cultural beliefs, AAPI parents may express their love for their children through working diligently for the family and demanding respect from their adolescents. Therefore, when considering parenting styles to understand AAPI adolescents' sexual behaviors, the fundamental differences between Eastern and Western cultural beliefs, particularly in relation to mother-adolescent interactions, should be considered.

Although there is still some disagreement among parenting experts on which parenting style is the most functional, generally speaking, the authoritative and authoritarian parenting styles are viewed as preferable to the permissive and indifferent parenting styles. A similarity noted between the authoritative and authoritarian parenting style is the high degree of demandingness. The concept of demandingness is very similar to the concept of "parental expectations" that often is interpreted by Eastern cultures as

being a part of parental love. Hence, when investigating maternal influences on AAPI adolescents' sexual behaviors, maternal expectations from an Eastern cultural perspective should be incorporated. At the very least, the potential differences in the interpretations of parental demandingness (or expectations) should be included. For this reason, the construct of "APMSE," which is similar to parental demandingness but still contains some components unique to Eastern culture, was included in the model tested in this study.

Another reason for including this construct was that despite the minority status and other differences of AAPI adolescents, in general, AAPI students have done well academically. In fact, the high level of aggregate achievements of AAPI students was one reason that the label "model minority" was given to this population (Lee & Kumashiro, 2005). Their academic attainment might be the reason for the considerable amounts of studies examining the relationship between the AAPI parent-child interactions and students' academic achievement (Chao, 2001; Hieshima & Schneider, 1994; Huntsinger, Jose, & Larson, 1998 ; Okagaki & Frensch, 1998; Wong, 1990), compared to other issues related to AAPI adolescence that are needed, such as investigations of health behaviors and mental health useful for developing culturally responsive general health and mental health programs. Most studies have found that AAPI adolescents' educational achievements are strongly correlated with their parents' educational aspirations and expectations for their adolescents (Chao, 2001; Okagaki & Frensch, 1998; Wong, 1990). Therefore, it is possible that AAPI adolescents' sexual behavior might be affected by their perceived sexual expectations from their mothers. For this reason, an investigation to see whether this perceived expectation (i.e., APMSE)

mediated the relationship between mother-adolescent interactions and adolescents' sexual initiation over time was examined and the effects of APMSE on delaying AAPI adolescents' later sexual initiation over time were verified in the AAPI base and gender comparison models. Furthermore, several cross-cultural differences in maternal influences were noted when compared AAPI base model in this study with the models from three other racial and ethnic groups.

The Effects of Exogenous Variables

The following discussion focuses on the effects on each construct (or variable) explored in the various models. In this study, two aspects of mothers' and adolescents' interactions were investigated, including the mothers' and adolescents' perceptions of communication (i.e., sexual discussions and general communication) and their perceived connectedness with each other. Although there have been incongruencies between mothers' and adolescents' perceptions of sexual discussion reported in the research literature (Jaccard, Dittus, & Gordon, 1998; Jaccard, Dodge, Dittus, Feldman, & Rosenthal, 2002; Jackson, Bijstra, Oostra, & Bosma, 1998), this study only examined the mothers' perceptions of sexual discussion, since the purpose of this study was not to investigate the consistency between mothers' and adolescents' reports but to examine the effects of maternal sexual discussions. Another reason for choosing maternal sexual discussion was that maternal sexual discussion has been shown in many studies to have a positive and consistent association with adolescents' safer sexual behaviors (i.e., condom use) (Crosby et al., 2001; Kirby, 1999; Miller, Levin, Whitaker, & Xu, 1998; Whitaker & Miller, 2000; Zhang et al., 2004). Hence, investigating its relationships with adolescents' sexual initiation over time may increase its applicability, particularly for the AAPI

population. Furthermore, efforts to promote parental sexual discussion often are used by health care providers, so evaluating its effects on APMSE and sexual initiation with AAPIs and other racial and ethnic groups may provide further evidence for the effectiveness of this type of practice.

Mother-adolescent interactions: Maternal sexual discussion

Despite our common beliefs and practices, the studies reporting on the effects of maternal sexual discussion on adolescents' sexual behaviors have been mixed (Clawson & Reese-Weber, 2003; Fisher, 1987, 1993; Kim & Ward, 2007; Miller, Forehand, & Kotchick, 1999; Swain, Ackerman, & Ackerman, 2006; Widmer, 1997; Wilder & Watt, 2002). Although many studies have found more frequent and positive maternal sexual discussions have been associated with increased contraception use, fewer sexual partners, and later sexual initiation and less frequent sexual activity (DiIorio et al., 2001; Jaccard, Dittus, & Gordon, 2000; Jaccard, Dodge, & Dittus, 2003; Jaccard, Dodge, Dittus, Feldman, & Rosenthal, 2002; Miller, 2002; Whitaker & Miller, 2000), one other study (Widmer, 1997) linked maternal sexual discussion with earlier sexual initiation. Because there was a limited understanding about the relationship between maternal sexual discussion and adolescents' sexual initiation among AAPI adolescents, it was important to examine the effects of maternal sexual discussion in this population group.

From all models examined in this study, maternal sexual discussion was not protective in terms of delaying adolescents' sexual initiation either for AAPIs or for adolescents of the other racial and ethnic groups. In fact, in the ethnic group comparison model, maternal sexual discussion predicted early sexual initiation at Wave 2 for all four groups. This finding contradicted previous research findings that suggested maternal

sexual discussion could delay adolescents' sexual debut. This variation in findings may be related to how the maternal sexual discussion was assessed. The items used in this study focus more on the extent of sexual discussion, such as the negative consequences and STIs. Although mothers' degree of discussion and their comfortable level of engaging such discussion were included in the construct, the content of sexual discussion was not included in the construct. It is possible that other factors (e.g., the content and/or the manner of sexual discussion) may play a role on the effects of maternal sexual discussion. Hence, future research should include the contents (e.g., values, expectations) and the manners of sexual discussion in the investigations.

In terms of the relationship between maternal sexual discussion and AMPSE, the results were mixed. From the tested models, for the most part, maternal sexual discussion was associated with earlier sexual initiation at Wave 1 and lower APMSE at Wave 1 and at Wave 2 for all groups, except in the AAPI gender model where maternal sexual discussion was positively associated with APMSE at Wave 1, but only for AAPI adolescent males. It is important to note that in the same gender model, maternal sexual discussion was still related to earlier sexual initiation at Wave 1 for AAPI adolescent males. For the most part, mothers' perceptions of sexual discussion was related a lower level of APMSE. For example, from AAPI base and gender models, maternal sexual discussion at Wave 1 did not predict a higher level of APMSE at Wave 2; instead, it was associated with a lower level of APMSE at Wave 2. In the gender model, a negative association between maternal sexual discussion and APMSE at Wave 2 was noted for both genders. Correspondingly, in the ethnic group comparison models, the negative association between maternal sexual discussion and the onset of sexual initiation at Wave

2 also was also present in all groups. However, the findings did not reach the level of significance in some of the studied models. For example, in the AAPI-AA and AAPI-HA comparison models, the negative associations between maternal sexual discussion and APMSE at Wave 1 were not significant.

Taken together, in this study, the effects of maternal sexual discussion were not protective in terms of delaying adolescents' sexual initiation or for promoting adolescents' perceived maternal sexual expectations (APMSE). The exception was for the AAPI adolescent males, where the effects on APMSE were only limited to Wave 1. This finding suggests that maternal sexual discussion primarily focused on negative consequences may not be sufficient to delay adolescents' sexual initiation, particularly when developmentally these adolescents may not perceive their susceptibility to the negative consequences described by their mothers. For this reason, other factors, such as the mother-adolescent relationship, gender, and/or the level of acculturation, also may be important for conveying maternal sexual expectations to adolescents in a manner that may delay adolescents' sexual debut.

Maternal perceived connectedness

Some research has suggested that the relationship between mother and adolescent plays a key part on adolescents' sexual behaviors (Jackson, Bijstra, Oostra, & Bosma, 1998; Miller, Kotchick, Dorsey, Forehand, & Ham, 1998). Although the results vary in terms of its relationship with sexual initiation, most studies (Resnick et al., 1997; Rodgers, 1999; Taris & Semin, 1997) have suggested that connectedness between a mother and her adolescent can lead to effective sexual discussions and further decrease risk of adolescent pregnancy. Because there is limited understanding about the

relationships among maternal perceived connectedness, adolescents' perceived maternal sexual expectations (APMSE), and sexual initiation, an investigation about these relationships with consideration of culture and gender variation was undertaken.

From our models, the effects of maternal perceived connectedness were significant in many ways. For example, maternal perceived connectedness was positively associated with a higher level of APMSE at Wave 1 and with later sexual initiation at Wave 1 in most of our models, with the exception of the AAPI acculturation model. The insignificant relationship for the acculturation model may have been the result of its greater complexity in the covariate model as well as the relatively smaller AAPI sample size ($n = 433$). It also may be explained by the position of the variable being changed from an exogenous variable to an endogenous variable when changing the AAPI base model to a covariate model.

The long-term effects of maternal perceived connectedness on APMSE were significant for some of these adolescent groups. For example, in the AAPI-white comparison model, maternal perceived connectedness predicted a higher level of APMSE at Wave 2 for both AAPIs and whites. In the AAPI-HA comparison model, maternal perceived connectedness was a significant predictor of later sexual initiation at Wave 2 for AAPIs. Although the relationship did not reach the level of significance for HAs, the coefficients for HAs were close to those of AAPIs ($-.064$ and $-.075$, respectively). Thus, it is possible that promoting maternal perceived connectedness may have promise for delaying HA adolescents', as well as AAPI adolescents', sexual initiation over time.

In sum, for AAPI and white adolescents, maternal perceived connectedness is an excellent predictor of adolescents' higher level of perceived maternal sexual expectations

over time; consequently, it could delay adolescents' sexual initiation. Hence, to delay AAPI, HA, and white adolescents' sexual initiation over time, an effective intervention strategy may be to promote their mothers' perceptions of their connectedness with their teenagers.

Adolescents' perceived general communication

Some research (Miller, Forehand, & Kotchick, 1999) has suggested that general communication between mothers and adolescents can predict adolescents' level of sexual behaviors. In our models, we investigated the general communication from adolescents' perspectives to examine its relationship with APMSE and the onset of sexual initiation over two waves when the cultural background, gender, and level of acculturation were considered. Overall, adolescents' general communication with their mothers did not predict a higher level of APMSE or later sexual initiation over time. To the contrary, adolescents' perception of general communication was mostly associated with earlier sexual initiation and lower level of APMSE at both waves, except for the HA and AA groups. It appeared that, of all these racial and ethnic groups, HAs were the only group without a negative association between general communication and sexual initiation. Although HA adolescents' perceptions of general communication was not shown to be protective (did not reach the level of significance) against early sexual initiation or for promoting APMSE, the absence of a negative association with early sexual initiation suggested its differential influence compared to the AAPI, AA, and white adolescent groups.

This cultural variation may be important to consider when designing intervention programs to delay HA adolescents' sexual initiation. It is possible that these HA

adolescents were less likely than the other adolescents in this study to mistake their general communication with mothers as demonstrating a permissive attitude toward teenage sexual activity. It also is possible that HA adolescents may have perceived their general communication with their mothers as being better than the adolescents from other groups. This finding is somehow congruent with Kim and colleagues' finding (1999) that general communication between HA mothers and adolescents was a good predictor for HA adolescents' sexual behaviors. This result further confirms the importance of considering cultural variation in patterns of communication between mothers and adolescents when providing health promoting nursing care to diverse populations.

Adolescents' perceived connectedness

To contrast with maternal perceived connectedness, adolescents' perceptions of connectedness also were included in all the models and were tested for relationships with APMSE and sexual initiation over two time points. From the models, the effects of adolescents' perceived connectedness was not as predictive of APMSE or early sexual initiation as maternal perceived connectedness. In fact, in the AAPI base and gender comparison models, its relationship with APMSE and sexual initiation were insignificant. It is important to note that the insignificant relationship might have been caused by an effect size that was too small to be detected by the small AAPI sample size ($n = 433$). When using the AAPI sample as a reference group for comparison with other groups that have a much larger sample size, the result was significant, particularly in the AAPI-AA and AAPI-white comparison models. Before making any inference, one needs to be cautious about interpreting the results since the effect might tend to reflect the group with the largest size after determining the variance between the two groups.

In the racial and ethnic group comparison and the AAPI acculturation models, there were several significant relationships. First, adolescents' perceived connectedness was related to later sexual initiation at both waves in both the AAPI-AA and AAPI-white comparison models. Second, its associations with APMSE at Wave 1 in the AAPI-white and AAPI-HA comparison models were significant; however, the direction of the influences differed in these two models. It appears that the relationship was positive for the white adolescents, but negative for these HAs. That is, different from these white adolescents, HA adolescents' perceived connectedness was associated with a lower level of APMSE at Wave 1. Third, in the AAPI-AA and AAPI-white comparison models, adolescents' perceived connectedness predicted later sexual initiation at both waves. That is, for AA and white adolescents, their perceived connectedness with their mothers was protective against early sexual initiation over time. These findings suggest that for AAs and whites, adolescents' perceived connectedness emerged as a protective factor for delaying adolescents' sexual initiation over time. However, this protective effect was not observed in the AAPI-HA comparison model. This variation may be rooted in the different cultural emphasis on individualism among racial/ethnic groups.

In the AAPI-HA comparison model, adolescents' perceived connectedness was negatively associated with APMSE at Wave 1. Since there was no significant relationship in the AAPI base model, it was assumed that the negative association was mostly from the HA group. Although there was not sufficient evidence to distinguish that the relationship for AAPIs was different from that of the HA or white adolescents, it could be concluded that there was a significant difference between HAs and whites in terms of the relationship between adolescents' perceived connectedness and APMSE at

Wave 1. That is, unlike the white and AA adolescents, HA adolescents' perceived connectedness was not protective against early sexual initiation at both waves; in fact, it predicted a lower level of APMSE at Wave 1. This variation may be related to different degree of individualism among HA, AA, and white adolescents. Therefore, future research should focus on cross-cultural difference because it is possible that while promoting adolescents' perceived connectedness might be effective for AA and white adolescents, it might not be as valuable for HA adolescents.

For the AAPI group, the relationships between adolescents' perceived connectedness and sexual initiation at both waves were insignificant in both the base and gender models. Although there were no significant differences detected when comparing AAPIs to the other racial and ethnic groups, there was a positive and significant relationship with APMSE at both waves when acculturation variables were included. This result suggests that for AAPI adolescents, when the level of acculturation was considered, adolescents' perceived connectedness predicted a higher level of APMSE at both waves. Although in the acculturation model a direct relationship between APMSE and sexual initiation was not significant, because of the positive relationship has been established in the AAPI base and gender models, we could assume that a positive relationship between APMSE and adolescents' sexual initiation may exist if given sufficiently large enough samples. However, it also is important to note that in the acculturation model, AAPI adolescents' perceived connectedness was associated with early sexual initiation at Wave 1, which was different than for the AA and white adolescents. Therefore, for these AAPI adolescents, the level of acculturation may be a moderator of adolescents' perceived connectedness relationship between APMSE and

sexual initiation. It also is possible that as AAPI adolescents become more acculturated with American culture, they might behave more like AA and white adolescents in that adolescents' perceived connectedness could positively associate with a higher level of APMSE or a later sexual initiation. This result is congruent with the notion that as AAPIs become more acculturated to mainstream American culture, their health attitudes and sexual behaviors become more similar to the white American norm (Okazaki, 2002)

APMSE

In general, the effects of APMSE were positive in the models tested. The extent of the influences, however, was different for the racial and ethnic groups included in the analyses. Overall, the most significant effects of APMSE were for the AAPI adolescents, where APMSE had a mediation effect between maternal perceived connectedness and adolescent sexual initiation at Wave 2. Although the mediation effect was not significant for the other racial and ethnic groups, a significant association between APMSE and later sexual initiation at same wave was noted for all groups as well as between AAPI males and females. The differences on the effect of APMSE between AAPI and other racial/ethnic groups may be related to AAPIs' cultural emphasis on collective values. Although these findings verify the important role of APMSE for delaying adolescents' sexual initiation for all adolescents, the findings also suggest a culturally responsive approach is needed when utilizing APMSE. Most importantly, while some cultural variations were observed for various racial and ethnic groups, it is important to note that promoting APMSE could be an effective general strategy for delaying adolescent sexual initiation.

Acculturation

One of objectives of this study was to evaluate the influences of acculturation on the AAPI base model. AAPI adolescents' level of acculturation is an important factor because according to the U.S. Census (1996), 96% of AAPI children either are immigrants or the children of immigrants. Because of the high percentage of immigrants among AAPIs, acculturation may play an important role in mothers' parenting style, mother-adolescent interactions, adolescents' perceived maternal sexual expectations, and sexual initiation. Therefore, it is important to include acculturation variables, such as language spoken at home and length of U.S. residence, in the structural model.

Language spoken at home

However important, one needs to recognize the mixed results from the literature on acculturation. Using logistic regression and with the Add Health dataset, Hahm and colleagues (2006) found a negative association between level of acculturation and adolescent sexual activity. In that study, the level of acculturation was determined by two criteria: whether the adolescent was born in the United States and whether the English language was spoken in the home. On the other hand, Yu and colleagues (2002) used AAPI adolescents' speaking English at home as a criterion for acculturation, and found that speaking English at home was associated with having better health behavior (i.e., less risky health behavior). In the study reported here, two attributes (adolescents' language spoken at home and length of U.S. residence) were simultaneously examined in a covariate model to understand their relationships with mothers'/adolescents' perceptions of their general interactions, APMSE, and adolescents' sexual initiation.

The result of our model testing showed that AAPI adolescents' speaking English at home was related to mothers' higher level of sexual discussion, mothers' perceived connectedness, and adolescents' later sexual initiation at Wave 1. Although these associations were encouraging for verifying the positive influences of acculturation on AAPI mothers' perceived sexual discussion, connectedness, and adolescents' later sexual initiation at Wave 1, at the same time, AAPI adolescents' speaking English speaking at home failed to predict adolescents' sexual initiation at Wave 2, adolescents' perceived communication, connectedness, or APMSE at both waves. These findings suggest that although AAPI adolescents' level of acculturation (as measured by speaking English at home) was protective against early sexual initiation at Wave 1, it was not significant at Wave 2. The insignificance might be related to the small effect size that was not detectable with this small sample size in the acculturation model; or it might be related to something that had changed over time for these AAPI adolescents.

One significant relationship that needs to be mentioned is the positive association found between adolescents' speaking English at home and their mothers' perceptions of their interactions (i.e., maternal sexual discussion and perceived connectedness). It appears that the more acculturated AAPI mothers were more likely to report more frequent sexual discussions and to be more comfortable with them; these mothers also reported having a higher level of perceived connectedness with their adolescents. These associations may be important when designing nursing intervention programs designed to promote AAPI maternal involvement in their adolescents' sexual health. Other relevant factors associated with adolescents' speaking English spoken at home (e.g., mothers'

ability to understand English) also should be considered, particularly when a large proportion of AAPI mothers may not speak or understand English.

Length of U.S. residence

Another attribute examined in relation to adolescents' level of acculturation was adolescents' length of residence in the United States. When constructing this variable, for those adolescents who were born in the United States, their length of residence was equal to their age. This calculation allowed it to be treated as a continuous variable; however, it was not possible to separate the second generation AAPI adolescents from those of an earlier generation. Although a descriptive analysis was completed to assess whether the AAPI adolescents who were born in U.S. were similar to those adolescents who were immigrants (about 46% and 45%, respectively, excluding missing data), the potential bias caused by different lengths of family residence in U.S. (e.g., immigrants of different generations) should be noted.

From our acculturation model, AAPI adolescents' years of residence was related to adolescents' perceived general communication and later sexual initiation at Wave 2. It appears that the longer the AAPI adolescents had lived in the U.S., the more likely they were to report later sexual initiation at Wave 2 and to have a higher level of general communication, which, in turn predicted a lower level of APMSE at Wave 2. The above associations were different from the results using adolescents' language spoken at home as an attribute for acculturation. AAPI adolescents' length of U.S. residence also was related to adolescents' perceptions of their maternal interaction (i.e., general communication) rather than to the mothers' perceptions of adolescent interactions (sexual discussion or connectedness). This variation is interesting and worthy of further

evaluation in other populations, such as Hispanic adolescents. It seems that although these two attributes were valid factors for determining adolescents' level of acculturation, the results differed in many ways. For example, English spoken at home required other associated elements for it to happen, such as mothers' ability to understand English. Thus, it is not surprising to see its associations with mothers' perceptions of their interactions.

Although the associations with the length of U.S. residence were limited, one important effect noted was its protective effect for delaying AAPI adolescents' onset of sexual initiation at Wave 2. That is, the longer AAPI adolescents lived in the U.S., the more likely their sexual initiation at Wave 2 would be later. This result was congruent with findings of Yu and colleagues (2002) that AAPI adolescents' level of acculturation was associated with lower health risk behavior. However, this result contradicted those of Hahm and colleagues (2006) using the same dataset, which found that AAPI adolescents' acculturation was associated with a higher level of sexual experience. The differences in findings may be related to the different methodological approaches used by these two studies. First, the criteria used in Hahm's study to determine level of acculturation were different from this study. For example, unlike the current study, Hahm used AAPI adolescents' birth place (born in US or not) and adolescents' language spoken at home to divide adolescents into different groups to represent their level of acculturation. Second, the criteria for sample selection were different between these two studies. For example, Hahm's sample selection were wider, which included AAPI adolescents from grades 7-12 without missing data (N=689), than this study (N=433). Third, the way of handling the dependent variable was different. For example, Hahm

used sexual experience at Wave 2 (a yes/no dummy variable), while this study investigated adolescents' onset of sexual initiation (a continuous variable). Therefore, the differences in these findings may be caused by different criteria for acculturation or different methodological approach used for investigations. Since there are no uniform criteria to characterize (or measure) adolescents' level of acculturation, it is hard to determine the precise effects of acculturation on adolescent sexual behavior. Future research needs to focus on the theoretical framework used in defining acculturation and interpreting acculturation influences. Another important evaluation regarding acculturation influences concerns the effects of adolescents' self-identified cultural affiliation. It is important to account for adolescents' own cultural identification when determining acculturation influences on the adolescents' sexual health behaviors. Only then can we have a clear picture explicating the influences of acculturation on adolescents' sexual behaviors.

Gender

There were several important findings from the AAPI gender comparison model. First, AAPI maternal sexual discussion had different effects on the APMSE of these AAPI adolescent males and females, with these boys and girls perceiving maternal sexual expectations differently. This might result from the different expectations of AAPI mothers for their daughters and sons related to sexual activities, as well as possible different information about sex provided by these mothers to their sons and daughters. For example, some research (Downie & Coates, 1999; Nowrojee, 1993) has suggested that adolescent females receive more information on the possible negative consequences of sexual activities from their mothers compared to the sons. Future research should

focus on how gender may play a role in the relationship between maternal sexual discussion and APMSE with other racial and ethnic groups.

Another important variation between AAPI adolescent males and females was a higher correlation between adolescents' self-reported sexual initiation at Wave 1 and at Wave 2 for AAPI adolescent females, with more consistent reports. That is, compared to males, for adolescent females who reported being sexually active at Wave 1, they also were more likely to report being so at Wave 2; this finding was the same for those adolescent females who reported they were not sexually active. Thus, this result suggests that early intervention to delay sexual initiation such as increasing the level of APMSE may be appropriate for AAPI adolescent females.

Besides this gender variation, several important similarities were noted between the genders; these were for the similar direct and mediation effects of APMSE at Wave 1 for delaying sexual initiation at Wave 2. It appears that APMSE at Wave 1 may mediate the relationship between maternal perceived connectedness and sexual initiation at Wave 2 equally between males and females. These effects further verify the important role of APMSE in AAPI adolescents. Thus, when developing strategies to delay AAPI adolescents' early sexual initiation in both adolescents boys and girls, strategies to increase maternal influences, should also focus on enhancing APMSE.

Implications

There were several important implications derived from this study. First, the significant effects of APMSE on sexual initiation were evident for AAPI and the three other racial and ethnic groups; however, the extent of the influences varied according to the adolescents' race and ethnicity. Overall, it was most significant for the AAPI

adolescents because it had significant across-waves predictive values on later sexual initiation at the Wave 2 time period. Although this predictive value was absent for the three other adolescent groups, the “same wave” predictive values were significant for all these groups. Therefore, while promoting APMSE a targeted strategy for adolescents from all these groups, the degree of protection might differ. For these AAPI adolescents, APMSE was similarly protective of early sexual initiation for both males and females. Second, maternal sexual discussion alone was not protective for AAPIs or the other racial and ethnic groups, except when compared by gender, in which maternal sexual discussion was associated with a higher level of APMSE only for AAPI adolescent males. This variation may result from maternal different sexual attitudes toward their sons and daughters. More research is needed to examine whether this difference by gender exists for other racial and ethnic groups.

Third, the significant role of maternal perceived connectedness was verified by all the tested models. Above all, for AAPI and HA adolescents, maternal perceived connectedness successfully predicted later sexual initiation at Wave 2. Although the across-waves predictive values were not significant for either AA or whites, it is important to note its significant association with later sexual initiation for all adolescent groups at Wave 1. Therefore, strategies to promote maternal perceived connectedness should be included in intervention programs that aim to delay adolescents’ sexual, particularly for AAPI, HA, and white families.

Third, the positive predictive effects of adolescents’ perceived connectedness on later sexual initiation were significant for AA and white adolescents, but not for HA adolescents. That is, for AA and white adolescents, their higher level of perceived

connectedness predicted later sexual initiation at Wave 2. Thus, promoting AA and white adolescents' perceived connectedness with their mothers may delay adolescents' sexual initiation. For HA and AAPI adolescents, the protective effects were not significant by themselves. For example, in the AAPI-HA comparison model, adolescents' perceived connectedness predicted a lower level of APMSE at Wave 1. Thus, the protective effects of adolescents' perceived connectedness were not observed for either the HA or AAPI groups when examined as a whole. However, in the AAPI acculturation model, adolescents' perceived connectedness predicted a higher level of APMSE at both waves. However, in the AAPI-AA, AAPI-HA, and AAPI-white comparison models, there were no significant differences detected in these three comparison models that determined a significant relationship between AAPI adolescents' perceived connectedness and their onset of sexual initiation; thus, although the protective effects of adolescents' perceived connectedness might be possible for AAPI through the group comparison models, the significant relationship was not observed in either the AAPI base or gender models. Altogether, promoting adolescents' perceived connectedness with their mothers would be most effective for AAs and whites, followed by AAPI adolescents when acculturation influences were considered. Fourth, negative effects of mother-adolescent communication (maternal sexual discussion and adolescents' general communication) on APMSE and sexual initiation were detected in most models, which were not expected. Overall, maternal sexual discussion was associated with lower APMSE and early sexual initiation, except for AAPI males where a positive association was found between maternal sexual discussion and APMSE at Wave 1; there also was an indirect effect existed for delaying sexual initiation at Wave 2.

Similarly, adolescents' perceived general communication was related to a lower level of APMSE and earlier sexual initiation, except for the AA and HA groups. For example, the negative associations between adolescents' perceived general communication and sexual initiation (or APMSE) were absent for HA adolescents, suggesting that different from the other groups, HA adolescents' perceived general communication was not related to adolescents' early sexual initiation or lower APMSE. The lack of negative effects suggests that promoting Hispanic adolescents' perceived general communication may be effective for delaying their sexual initiation or for increasing their APMSE. Moreover, adolescents' perceived general communication predicted a higher level of APMSE at Wave 2 for the AA adolescents. This positive association signifies the potential for promoting their general communication with their mothers as a means for increasing APMSE in AA adolescents.

Taken together, the study results suggest that some variations exist for adolescents from different racial and ethnic backgrounds. Interventions that aim to increase APMSE or delay adolescents' sexual initiation should consider cross-cultural differences in how they perceive and react to their mothers' sexual expectations. For AAPI and HA adolescents, increasing maternal perceived connectedness and APMSE may be most effective for discouraging risky health behaviors including early sexual initiation. Other possible positive effects of adolescent perceived general communication were noted for AA and HA (and possibly AAPI) adolescents. For AA and white adolescents, increasing mothers' and adolescents' perceived connectedness and APMSE may be valuable.

Limitations

Several limitations were noted for this secondary data analysis. First, because the measures used for this study were not originally designed for the purpose of the study reported here, measurement of some constructs was less than perfect. Thus, further study should be conducted to verify the validity of constructs tested in this study, such as the construct of APMSE. It would be important to develop a psychometrically sound instrument to measure adolescents' perceived maternal sexual expectations (APMSE) and to test its relationships with adolescents' sexual behaviors so that more could be learned about maternal (or parental) influences in areas related to adolescents' sexual health. Second, in this study, AAPIs were collectively treated as one group; this approach, however, should not lead to an assumption that AAPIs are a homogenous group. On the contrary, AAPIs are a heterogeneous population that is comprised of many different subgroups and cultures. The reason that the AAPIs were used as one group in this study was to overcome the limitation of having a small sample size. Therefore, the results of this study should not be generalized to any one particular group of Asian Americans or Pacific Islanders. Future study should focus on the possible cultural differences among this heterogeneous population group. Third, the acculturation covariate model was too complicated to be accurately tested with the small AAPI sample. To verify the acculturation influences used in this study, it would be important to test the acculturation model with the HA adolescent group ($N = 1,241$) to see whether a similar result could be generated to verify acculturation influences with another rapidly expanding, immigrant population in the United States. Fourth, the family SES was not included in the model testing, it would be important to include this variable in the future endeavor to understand

its potential influences on mother-adolescent interactions in relation to adolescents' sexual behaviors.

Conclusion

In this study, the effects of mothers' and adolescents' perceived connectedness on APMSE and sexual initiation were greater than those of mothers' and adolescents' perceived communication. This result is somewhat different from most current practices of encouraging parents to talk with their adolescents about sex. Although maternal sexual discussion had a positive effect on promoting adolescents' condom use in other studies (Crosby et al., 2001, , 2002; Miller, Levin, Whitaker, & Xu, 1998; Walker, Torres, Gutierrez, Flemming, & Bertozzi, 2004; Whitaker & Miller, 2000), the study reported here showed that maternal sexual discussion that focused primarily on the negative consequences of sexual activity may not be effective in delaying adolescents' sexual initiation. It is possible that an alternative emphasis in sexual discussion should be focused on the transmission of maternal (or paternal) values, sexual expectations, and emotional support (or connectedness).

Since research (Kinsman, Romer, Furstenberg, & Schwarz, 1999; Sieverding, Adler, Witt, & Ellen, 2005; Udry, Campbell, & Rossi, 1994; Upchurch, Aneshensel, Sucoff, & Levy-Storms, 1999) has closely linked early sexual initiation in adolescents with many risky behaviors (e.g., alcohol and drug abuse, unprotected sex, more frequent sexual activities, sexual transmitted infections, and unwanted pregnancy), promoting adolescents' sexual health also should include strategies designed to delay adolescents' sexual initiation. Therefore, in addition to promoting maternal sexual discussion to improve adolescents' safe sex practices, family interventions should focus on other

strategies to delay adolescents' sexual initiation. These findings suggest that to increase adolescents' perceived maternal sexual expectations and delay adolescents' sexual initiation, establishing a trusting relationship between mother and adolescent and promoting mother-adolescent connectedness is fundamental for such conversations between mothers and adolescents to be successful.

Another important maternal influence observed by this study was the effects of APMSE on delaying adolescents' sexual initiation. Although the extent of its influence varied among these adolescent groups, its effectiveness was indisputable based on the results of tested models. The exploration of the effects of APMSE is a rather new approach compared to previous studies that used a Western, individual-focused perspective for their investigation. For example, the construct of adolescents' intention to act is a typical individual-focused construct. Since the targeted population of this study was Asian Americans and Pacific Islanders, this study used an Eastern collective-focused viewpoint.

Adolescents' perceived maternal sexual expectation (APMSE) is an expectation that adolescents may have through interactions with their mothers. Hence, this construct is more collective-focused. Although the results verified that AAPI adolescents' behaviors were indeed more collective in nature, one cannot deny the significant effects that APMSE had on later sexual initiation at the same waves for these AA, HA and white adolescent groups. These findings suggest that adolescents from all groups considered their mothers' sexual expectations when deciding whether to become sexually active. Therefore, researchers who aim to promote adolescents' sexual behavior should not only target promotion of maternal sexual discussion for safer sexual practices (i.e., condom

use), but should also encourage and promote a trusting relationship between mother (or father) and adolescent.

In this study, the findings for acculturation influences were limited to two attributes of acculturation, language spoken at home and the length of U.S. residence. Other aspects of acculturation were not investigated. Overall, these two attributes were related to later sexual initiation at different waves. In addition, the results closely linked adolescents' language spoken at home with their mothers' perceptions of interaction with adolescents, whereas AAPI adolescents' length of U.S. residence was related to these adolescents' perceptions of interaction with their mothers. Because the sample size studied was small for such a complex model, some relationships did not reach the level of significance for AAPI group. It may be important to conduct a similar analysis with another immigrant population, such as Hispanic Americans, to better understand how acculturation may influence adolescents' interactions with their mothers, how they may perceive their mothers' sexual expectations, and how such expectations may influence sexual initiation. Similarly, although there were some gender differences for AAPI adolescents in the gender comparison model, it would be important to examine and compare gender differences in other racial and ethnic groups. Only then, can we gain a clearer picture of the influences of acculturation and gender on diverse cultural groups.

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